HOME READING

The Farm

HOW TO BUY FARM INSURANCE

FARMING IN THE HOLY LAND

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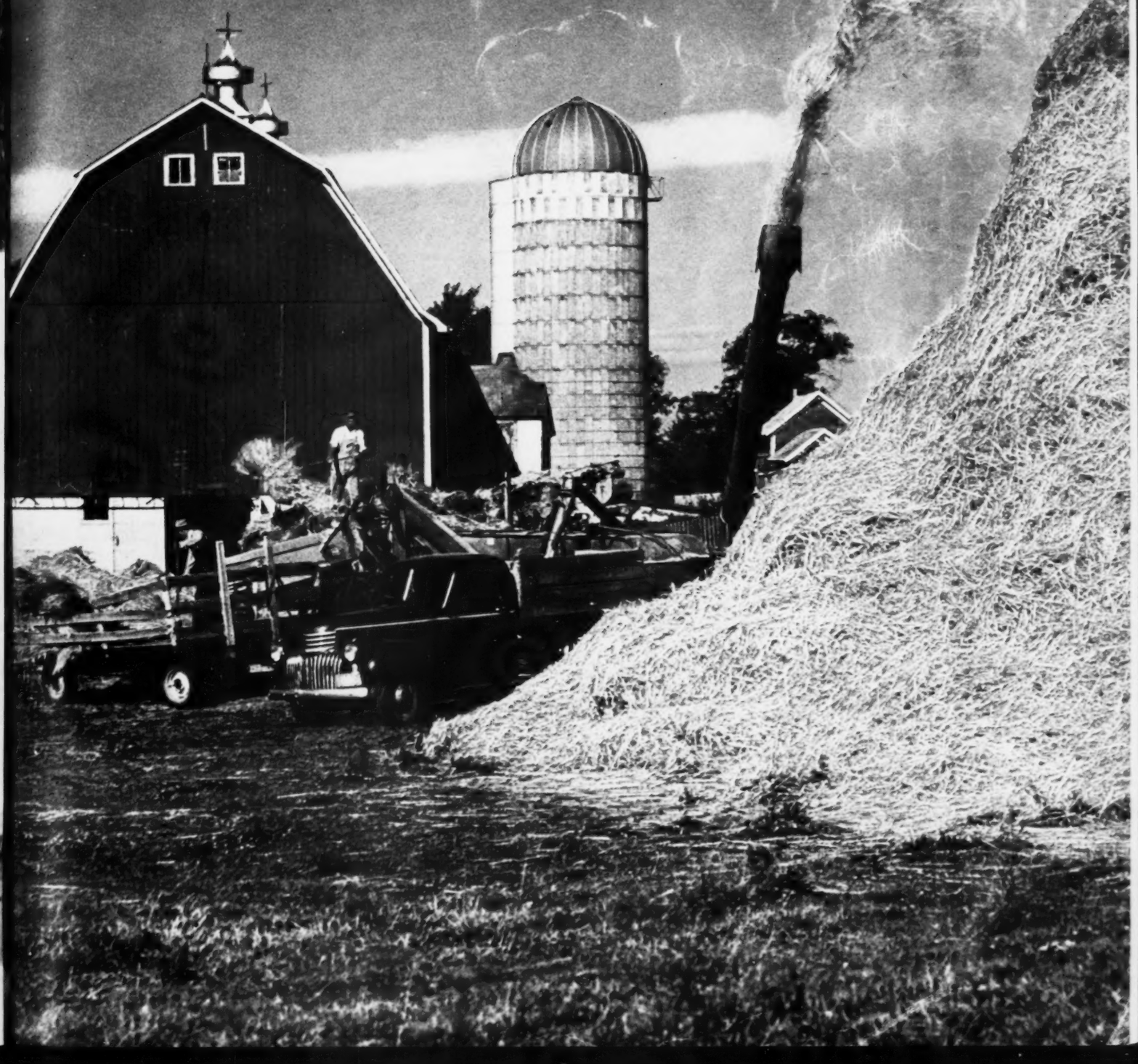


why not ask
the real experts
about tractor tires?

EST way to get the truth about any prod-
uct is to ask the folks who use it, day
nd day out.

en it comes to tractor tires, farmers know
t about what those tires will do—because
mers know from experience which tires
e greater traction, clean better, last
ger.

ey are the tractor tire experts you can't
l with claims—the farmers who have
d *all* makes of tractor tires in years of
thand working experience in the field.

ey say Goodyear's Super-Sure-Grips pull
ere other tires won't. They say Goodyears
longer.

ey say it in national surveys year after

year—vote Goodyear's Super-Sure-Grips their *First Choice* tractor tires. *And there is no close second in this preference vote!*

Isn't this expert opinion your surest guide to the best tractor tires? Especially when Goodyears cost no more?

FIRST in Traction!—FIRST in Long Wear!—FIRST in Popularity!

GOODYEAR

Super-Sure-Grip Tractor Tires

Super-Sure-Grip—T. M. The Goodyear Tire & Rubber Company, Akron, Ohio

The Super C backed in and pulled the disk right out.

You can prove McCormick® Farmall® pull-power to yourself

The disk harrow was weighted down until a 2-plow tractor pulling it lost traction and the wheels began to spin. Then the Farmall Super C backed into the identical wheel tracks and pulled the disk out!

That is the difference between Farmall pull-power and a tractor that is short on traction. It means having correct power-weight balance built into your tractor.

Farmall pull-power means you have both ample power and positive traction, so that *rear-mounted equipment* can follow natural draft lines.

Farmall pull-power means you have both power and traction for *front-mounted equipment* — like a middlebuster, planter, cultivator.

Farmall pull-power means you have both power and traction combined into a balanced unit to pull *trail-behind equipment* through soft spots — where other tractors bog down.

But more, Farmall pull-power means you get more useful work from every gallon of gas—the tractor wheels carry you forward, instead of wasting fuel in excessive slippage.

Also, Farmall pull-power cuts your manpower costs — the operator can maintain most efficient operating speed in either loose or hard ground.

Your International Harvester dealer wants you to Prove to Yourself that Farmall Pull-Power *pays*. See him today. Arrange, without obligation, for a Farmall demonstration on your farm. Drive a Farmall Super C yourself—you'll understand why Farmalls are the most popular tractors built.

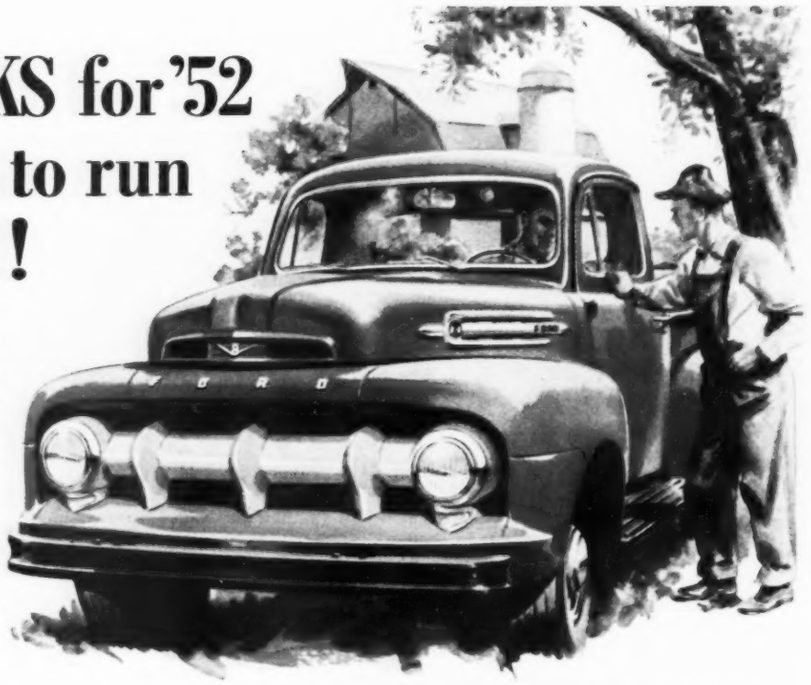
INTERNATIONAL HARVESTER

International Harvester products pay for themselves in use—McCormick Farm Equipment and Farmall Tractors . . . Motor Trucks . . . Crawler Tractors and Power Units . . . Refrigerators and Freezers—General Office, Chicago 1, Illinois

FORD TRUCKS for '52 cost still less to run in farm work!

You can see actual figures on Ford Truck running costs in farm work! Final Results on the nationwide 50-million-mile Economy Run include hundreds of farm truck costs. Your Ford Dealer has them now! He can show you how little it costs to run a Ford Truck!

New Ford Trucks for '52 cost *still less* to run! Ford's step-ahead engineering adds three much-talked-about new LOW-FRICTION engines to the line. Two old favorites feature increased power. For 1952, five great engines give you more power, and more economy, too, in a full truck line from 101-h.p. Pickups to 155-h.p. BIG JOBS.

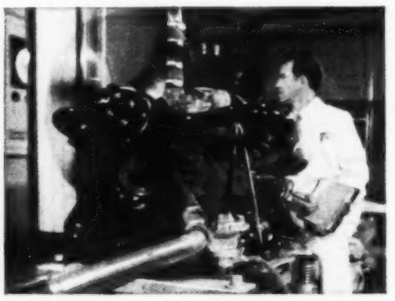


NEW 6½-ft. farm Pickup is one of many models that range up to 155-h.p. BIG JOBS. Choice of V-8 or Six.

NOW! GAS SAVINGS UP TO 14%

...AND MORE POWER, TOO!

Three new Ford Truck engines feature high-compression, LOW-FRICTION, overhead valve design. New short stroke cuts piston travel up to 20%... reduces friction... releases more power for useful work!



OVER 50,000 dynamometer test hours! Over 500,000 vehicle test miles! Two years of testing... all this on the 101-h.p. engine alone! New Ford LOW-FRICTION engines are probably the best proved truck engines ever introduced to the American farmer.

TWO FAMOUS FARM WORKHORSES give you more power for '52

This world-famous 239 cu. in. Ford V-8 now has 106-h.p.

Proved 254 cu. in. Ford BIG SIX now has 112-h.p.

● You "walk" big loads right off the field with the increased power in these two farm favorites. More power means faster delivery... more time saved to put in on other work.

The Power Pilot in these, and all Ford Truck engines, is still a Ford exclusive in the low-price field. It gives you the most power from the least gas.

Using latest registration data on over 7,318,000 trucks, life insurance experts prove Ford Trucks last longer.

NEW 101-h.p. LOW-FRICTION Cost Clipper Six—with short piston stroke, Full-Flow oil filter and other advancements—cuts friction horsepower 30%.

LOOK at this book to see how little it costs to run Ford Trucks in farm work. It shows figures on big farm trucks and small farm trucks, from coast to coast.

RIDE in comfort, ride in style! Choice of two fine cabs—the 5-STAR Cab or, at added cost, the 5-STAR EXTRA Cab which gives you many added features such as foam rubber seat padding, dome light, two door locks, and two arm-rests.

Availability of equipment, accessories and trim as illustrated is dependent on material supply conditions.

Farmers Buy What They PREFER... and THERE ARE MORE FARM TRACTORS ON

Firestone TIRES *Because—*

FARMERS have always preferred the advanced design and better all-around performance and pulling power of Firestone tractor tires. Only Firestone Champion Tractor Tires give these extras:

Curved and Tapered Bars . . . For a sharper bite and greater penetration.

Flared Tread Openings . . . To prevent soil jamming and to permit easy soil release.

Wide, Flat Treads . . . For greater traction power and longer life.

A Choice of Two Tread Designs . . . Open Center and Traction Center patented tread designs.

These are just a few of the many reasons why there are more farm tractors on Firestone tires than any other make. Go to your Firestone Dealer or Store and see for yourself why Firestone tires pull better, last longer, and turn out more work for your tire dollar.

When You Order a New Tractor or Other Farm Equipment, Specify Firestone Tires

Firestone Put the Farm on Rubber

FIRESTONE TIRES ARE *FIRST* WITH FARMERS TODAY

Enjoy the Voice of Firestone on radio or television every Monday evening over NBC

Copyright, 1952, The Firestone Tire & Rubber Co.

Setting New Standards...

FOR LIGHT-TRACTOR PERFORMANCE

JOHN DEERE "M" Series TRACTORS

AND A GREAT LINE OF QUIK-TATCH TOOLS

A John Deere "M" Series Tractor with matching tools for your farm is worth more to you *because it offers more.*

Get up on the seat of one of these modern, quality-built tractors and *drive it* . . . on your own place if you like . . . and make note of the extra values it offers you.

Put it under load—you'll quickly see that it has that same lugging power and sustained speed which have made the larger John Deere 2-cylinder tractors famous for getting *more work done in a day at lowest operating and maintenance costs.*

At the same time, we believe you will find that you have never before operated a tractor so easy to handle, so comfortable for the operator—one that gives you so much value in the features that mean most.

And remember, John Deere "M" Series Tractors are available with a wide choice of field-proved Quik-Tatch working tools to handle efficiently the many jobs on your farm.

Get full information from your John Deere dealer. Write for free literature on the model (or models) in which you are interested.

JOHN DEERE

MOLINE • ILLINOIS

M

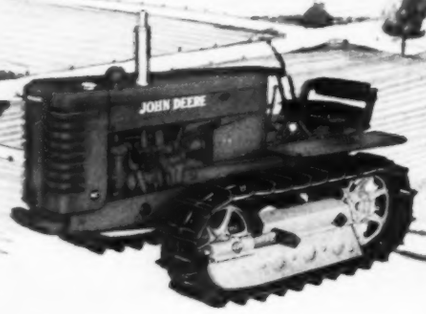
1-2-Plow General-Purpose . . . For Complete Power on Smaller Farms . . . Helper Tractor on Larger Farms.

MT

1-2-Plow Tricycle-Type General-Purpose . . . Big-Tractor Capacity in Cultivating with Light-Tractor Economy.

MC

2-3-Plow Track-Type . . . for Use Wherever Extra Traction, Flotation, and Stability Are Required for Best Work.



ASK FOR A DEMONSTRATION

COMING IN FALL

Fall is the time of year when hunters spring up in barnyards. Their first words usually are: "Can we go out in the back fields and shoot a few rabbits?" Unfortunately, there are a lot more hunters who climb over the fences, leave gates open and don't ask permission to hunt. For the farmer with stock, who is already worrying about cholera or anthrax being carried in by the birds from other farms, a squad of hunters is less than welcome. What can he do about it? There is a practical answer in the article, "The Farmer and the Hunter."

Arthur Godfrey is at home on a tractor or in a Navy plane and he will be "at home" for FARM QUARTERLY readers in our Fall issue. If you would like to see what his modern farm in Virginia looks like, you will enjoy FARM QUARTERLY'S pictures and the interesting story on his hard-working farm.

Grade A milk houses are no longer built out of whatever left-over lumber or concrete blocks there are around the farm. To give you all the information you will need to build a Grade A milk house, there are plans and cost figures, as well as useful information on materials and equipment in the article, "How To Build a Grade A Milk House."

"Raising Pigs Without Brood Sows," details the method of making bigger pork profits on substitute sow's milk. These are the proven programs used by pig hatcheries to keep down losses.

"Is Artificial Insemination All It's Cracked Up to Be?" takes a new look at a subject on which there apparently is no middle ground. People either are completely sold on it, or don't want to use it at all. Farmers who believe in it and farmers who do not, farmers who want to use their own bulls in a line breeding program, all have given the Editors their ideas for this stimulating article.

"Go South, Young Man," looks in on Yankees who have gone to the worn-out land of the Carolinas, Mississippi and Alabama, rejuvenated it to raise beef and dairy cattle on year around pastures. Northern money and farming know-how have been welcomed with open arms in most areas of the South.

There is an article on Krilium; the Lydella Fly which eats corn borers as if they were popcorn; Glass Lined Silos; Raising Geese; Fall Seed Beds, and an appetizing article, "How to Make Applebutter."

The Farm Home Section features an article on home-made cheese of interest to those who have surplus milk or skim milk which they would like to make into their own farm brand of cheese.

FARM QUARTERLY's pictures will bring the beauty of the harvest and autumn landscapes for you to enjoy in full color.

THE FARM QUARTERLY
22 East Twelfth St., Cincinnati 10, Ohio

R. J. McGinnis.....Editor
Fred Knoop.....Executive Editor
Grant Cannon.....Managing Editor
Joann Bell Pierce.....Associate Editor
James M. Smith.....Associate Editor
Edna O'Connell.....Editorial Secretary
Aron M. Mathieu.....Business Manager

The wooden plough and mixed team of the Israeli peasant will soon be legend.

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Farm Quarterly, Vol. Seven, No. Two. Publication, Editorial and Executive Offices, 22 East 12th St., Cincinnati, Ohio. Published quarterly by the Automobile Digest Publishing Corp.. Copyright 1952. Subscription price 50c a copy; $2.00 for one year; $3.50 for two years; $5.00 for three years. Add $1.00 per year extra for rates outside the U. S. and Canada. Send check or money order with subscription to 22 East 12th St. Cincinnati, Ohio. Entered as second class matter at the Post Office at Cincinnati, Ohio, under the Act of March 3, 1879. Additional second class permit entered at the Post Office, Greenwich, Conn. (Title Reg. U. S. Pat. Off.) Autumn issue on sale Sept. 6.

B.F.Goodrich

tires give Garling Farms long-run economy

GARLING FARMS lies in the heart of the Rio Grande Valley near Harlingen, Texas. Its 2,200 acres of rich soil produce cotton as well as many kinds of vegetables.

Forrest Garling has farmed this land for over twenty years. Today his operations call for four foremen and an average of forty farm hands throughout the year—plus more than a thousand extra workers during the cotton-picking season. Fifteen tractors work the fields, while ten trucks, three passenger cars and two Jeeps handle other farm chores.

Much of the farm's acreage is devoted to cabbage, a vegetable requiring a great amount of irrigation. This makes the soil muddy and heavy, so tire traction is one of Mr. Garling's chief problems. That's why he prefers B. F. Goodrich Power-Curve tractor tires—the tires that tests prove outpull other leading makes.

Power-Curve tires give you this full shoulder-to-shoulder traction because each cleat is pointed with an arrowhead nose that bites into the soil. No spinning wheels to waste time and fuel—every turn of a Power-Curve tire counts. Dirt drops out of open channels between the evenly spaced cleats. Power-Curve tires stay clean—another aid to maximum traction. And Power-Curve tires wear longer because the cleats are actually higher in the center than those of the other two leading makes. Add up these facts and you will understand why Mr. Garling likes the long-run economy Power-Curve tires give.

To prepare cotton land for planting, Garling Farms uses tractors equipped completely with BFG tires—from "Easy Steer" and Multi-Ring front tires to Power-Curve rear tires.

These Tubeless Tires have rolled 21,000 miles without a flat. Forrest Garling, pictured with his daughter, Sherry Ann, expects another 25,000 miles from them.

More recaps from BFG truck tires

Garling Farms carries its preference for BFG tires to its cars and trucks. Mr. Garling recaps B. F. Goodrich truck tires regularly—feels they are good for as many as four recaps. All BFG truck tires of 8 or more plies are built with the exclusive nylon shock shield. Extra-strong nylon cords absorb shock and protect the tire body. Tires wear longer. You get more recaps and more miles per recap.

Successful farmers such as Forrest Garling benefit from the extra savings of B. F. Goodrich tires. That's why all their equipment—implements, tractors, trucks and cars—roll on BFG tires. No matter where you farm or the size of your operation, you also can benefit from BFG tires. See your local B.F.Goodrich retailer—you'll find him listed under Tires in the Yellow Pages of your telephone directory—or write: *The B. F. Goodrich Company, Akron, Ohio.*

Heavily irrigated cabbage fields call for the extra power BFG tires give.

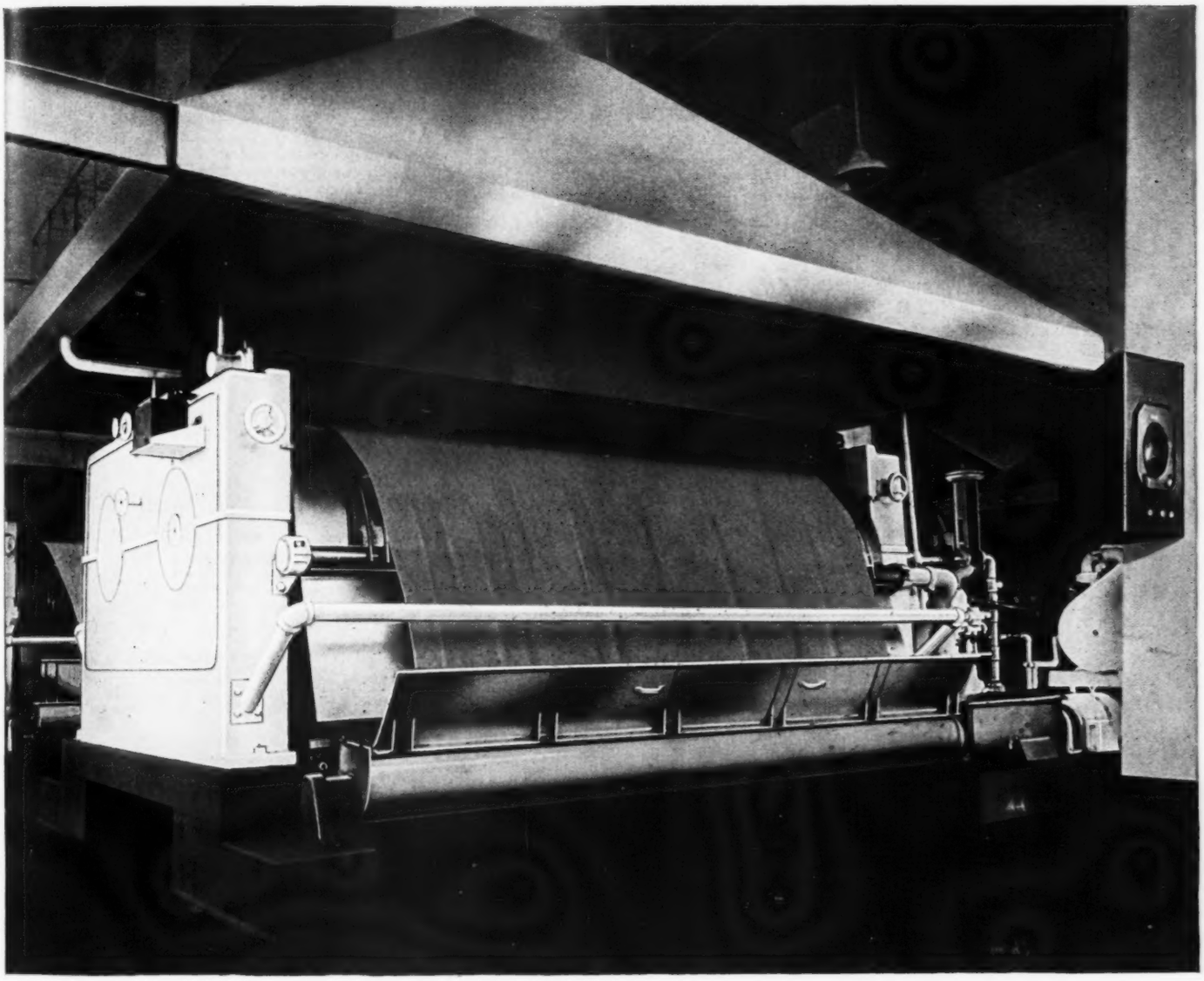
B. F. Goodrich "Life-Saver" Tubeless Tire defies skids!

The *new* "Life-Saver" Tubeless Tire not only seals punctures and protects against blowouts—*it defies skids, too!* The tire has a new kind of tread engineered with thousands of tiny, flexible "grip-blocks". In wet weather, these "grip-blocks" grip for quick stops because they wipe the road so dry you can light a match on it. Starting up, they grip like a caterpillar tread to get you going fast. No wonder in rain this "Life-Saver" tire stops in as much as 20% less distance, pulls as much as 40% better than regular tires.

And the "Life-Saver" *outwears* other passenger tires, too, because the tiny tread blocks have a "walking action" that reduces scuffing. The new BFG "Life-Saver" Tubeless Tire *may* save your life, *can* save you trouble, *will* save you money!

New "Life-Saver" Tubeless Tire tread wipes a wet road so dry you can light a match on it!

RESEARCH KEEPS B.F.Goodrich FIRST IN RUBBER



Concentrated Nutrition . . .
for the American Farmer

Fragrant, toasted sheets of concentrated proteins, minerals, vitamins and fermentation growth factors, roll from drum dryers, like that shown above, to be broken up and then shipped to feed mixers for use in balancing commercial feeds. In this way, farmers are supplied one of the most nutritious of all feeds — Seagram Solubles.

Seagram is engaged in a continuing Research Program in co-operation with the feed industry to help achieve maximum feeding efficiency.

JOSEPH E. SEAGRAM & SONS, INC., LOUISVILLE 1, KENTUCKY

Seagram SERVICE TO AGRICULTURE

EATON 2-Speed Axles

Make Farm Trucks Bigger Money Earners

More Payloads Per Day – Custom hauling is a big extra-income business for many farmers. With an Eaton 2-Speed Axle you get around faster – fewer holdups in soft going and hour-saving speed on hills and long highway runs.

J. Frank Rushin (left) and GMC dealer, A. A. Thompson, Columbus, Georgia. Says Thompson: "The Eaton 2-Speed Axle means longer life for the whole truck because the driver can select the proper gear for the load and road. 90% of the farm trucks we sell are Eaton Axle equipped."

Around The Farm where there are all kinds of going – from fresh-plowed ground to hardpan – an Eaton 2-Speed Axle with its low-gear range gives a truck the pull to take a load anywhere.

IN ADDITION to running a farm, J. F. Rushin of Columbus, Georgia, does plenty of hauling for others.

So he wanted a truck for both on and off-the-highway service. An Eaton-equipped GMC was the answer.

"The low-range gears of the Eaton 2-Speed Axle give me more pulling power around the farm where I need it. With the high-range gears I make better time on long hauls over the highway," says Rushin.

"I figure I get 20% better highway speed, and the savings in gas and maintenance costs are considerable. I can earn more with this Eaton-equipped truck," he says.

Thousands of farmers who use trucks for both farm work and custom hauling find Eaton-equipped trucks are bigger money earners. Talk it over with your truck dealer.

EATON

EATON MANUFACTURING COMPANY, CLEVELAND, OHIO

2-SPEED *Truck* AXLES

IT'S A SNAP TO SHIFT
1. MOVE BUTTON
2. PUSH PEDAL
and your speed ratios
● ● ● ●
are now doubled
●● ●● ●● ●●
enabling you to match the load to the road saving engine, time and fuel.

MORE THAN A MILLION IN TRUCKS TODAY

Other *Products*: Sodium Cooled, Poppet, and Free Valves Tappets • Hydraulic Valve Lifters • Valve Seat Inserts • Rotor Pumps • Conventional Motor Truck Axles • Permanent Mold Gray Iron Castings • Heater-Defroster Units • Spring Washers and Screw Assembly (Springtites) • Snap Rings Cold Drawn Steel • Stampings • Leaf and Coil Springs • Dynamatic Drives, Brakes, Dynamometers

MORE PIG-GROWING POWER TO THE POUND!

THE ONE AND ONLY

This spring, start your pig litters *fast as a rocket*...with Wayne Tail Curler, the amazing pig starter super-feed already famous for making runty pigs thrifty and normal pigs thriftier.

With Wayne Tail Curler, you get *more pig-growing power to the pound* than ever before...with LESS feed, time and work than ever before, too! That's because famous Wayne IQ (Ingredient Quality) and Wayne IB (Ingredient Balance) *assure* proper proportions of all necessary nutrients, including ANTIBIOTICS, VITAMIN B_{12} (APF) AND MANY OTHER HIGH POTENCY INGREDIENTS.

So get set now with a *power take-off* for your spring pigs with Wayne Tail Curler! Also does wonders for runts and poor-doing shotes, poor milking sows, poor eating boars, problem-feeder pigs. And what an eye-catching bloom it puts on show and sale animals.

That's why hog feeders say—does so much! costs so little! Get your supply of power-packed Wayne Tail Curler *now* from your local Wayne Dealer. Make sure it's WAYNE...the Brand in Demand!

ALLIED MILLS, INC. *Builders of* TOMORROW'S *Feeds* TODAY!

Executive Offices: Chicago 4, Ill. Service Offices: Ft. Wayne 1, Indiana

more field time!

2 in 1 chrome piston ring set

More than doubles the life of cylinders, pistons and rings

More operating time, fewer engine overhauls! Both are accomplished with Perfect Circle's 2-in-1 Chrome Piston Ring Set!

Solid chrome plating protects engines against dust, dirt, heat and long hours at full load . . . actually doubles the life of cylinders, pistons and rings!

And, to assure maximum oil control in *every* engine, interchangeable springs are supplied with each oil ring: a NORMAL PRESSURE spring for installation in rebored or slightly worn cylinders and a HIPRESSURE spring for the oil pumpers or badly worn cylinders.

Whether you maintain your own equipment or rely upon your dealer or favorite mechanic, insist upon Perfect Circle's 2-in-1 Chrome Set . . . for sustained power and positive oil control.

Perfect Circle

PISTON RINGS

The Standard of Comparison

LETTERS

The Hungarians Feed Cobs

Sirs:

I am a Hungarian veterinarian and dairy farmer. I read a article "Feeding 4200 Beef Cattle" in your nice "Farm Quarterly."

I am sure I am not perfect in the English language, I am here only 3 months and it is not so very easy to learn a language as the English. I try to explain you or if you like better answer to this article.

As I read between the rows of the article this gentleman Mr. Roswell Garst would be the one of the first who use the corn cob for feed the cattle. I think it must be so, because I see all round in America the corn cob heaps round the farms. I was in Kentucky, Wisconsin, Minnesota, South Dakota and everywhere one can see the big heaps of them.

We in Hungary started to feed the cattle and the hog with corn cob about 1938. But we use the corn cob not only for hog, cattle but all kind of domesticated animals. In Hungary we have had a hammer-mill (Medicago) which ground the corn with the cob together never was the corn shelled off. The hammer mill was as large as one could fill at once with 4-5 men shoveling the corn not shelled into it. The hammer mill made a very fine flour from the corn containing the cobs too. But I hardly think that here the corn cob would be better as was in Hungary where we take corncob as good as a third class grass hay from the field and not as a good legume hay.

If we are mentioning the legume hay perhaps I can tell you we fed our legume hay never long, but milled with hammer mill. This mentioned hammer mill made from dry hay a very fine flour and we mixed it with other food. In Hungary a modern farmer fed his hogs always with fermented food. With fermented food the cattle can eat much more as from the not fermented food. If a Hungarian farmer start to feed cattle and he was finish with them for export use a 5-6 years old: ox must be 1800-2000 lb. This was Simmenthaler cattle larger as the Holstein cattle here in America. But were some more in weight as I mentioned. Some of them were very good milkers. A cow "Ruca 100" gave during 365 days 31,994 lbs. milk, and 1,178 lbs. butter fat: the "Augusta" during 365 days gave 23,414 lbs. of milk and 1,535 lbs. butter fat, this cow sometimes gave 9.3% butter fat, but not long time; the "Basa" gave daily 120 lbs. milk, 4.2% butter fat; "Belfa 10" gave daily 133 lbs. milk, 3.4% butter fat.

Dr. Eugene Kormendy
2010 W. 50th St.
Cleveland 2, Ohio

How Can a Poor Man Eat?

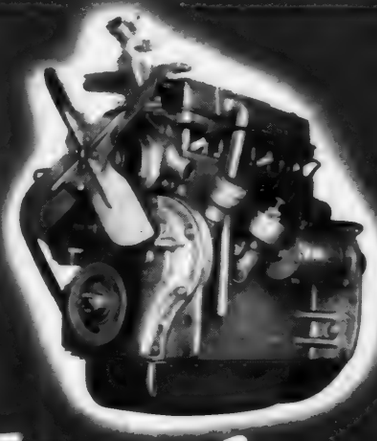
Sirs:

I was tickled to see your article on the Arkansas Mule, but you ought to have noted that it has a long history of being printed in farm publications. It is actually a classic of American folklore and was used by old Oscar Ammeringer in his American Guardian magazine of years past. It was turned into a hillbilly song by one Bob Miller of Tin Pan Alley, formerly of Memphis, Tenn., who also wrote the song "Seven-cent cotton, forty-cent meat, how in the world can a poor man eat?"

I hope you put in a few more things like this from time to time to remind us of the past which American farmers are trying to work their way out of.

Peter Seeger
Beacon, N. Y.

The mighty power of a great new engine



plus the one and only Ferguson System

. . . THAT'S THE

FAR MORE POWERFUL FERGUSON "30"

Ferguson's mighty valve-in-head engine, with the most remarkable torque characteristic of all, gives you enormous lugging ability. This power, working with the genuine Ferguson System, gives unexcelled performance that only the Ferguson "30" can offer.

There's much more to the story of Ferguson Power and the Ferguson System, of course, and any Ferguson Dealer will gladly give you all of the details.

The important thing to be said here is that performance such as this permits you to farm more of your land . . . easier, more intensively and at lower cost. You'll find, as have thousands of owners, that the Ferguson "30" meets more of your needs *more* of the time than any other tractor.

GET "SHOWDOWN" PROOF

Call your Ferguson Dealer today and arrange for a "Showdown" demonstration right on your own farm. Then compare Ferguson all-around performance with that of any other tractor.

★

Ask your Ferguson Dealer for a copy of "The Axe and the Wrench" . . . a simple explanation of torque. Or write to Harry Ferguson, Inc., Detroit 32, Michigan

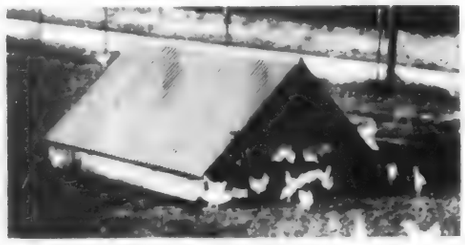
Copyright 1952 by Harry Ferguson, Inc.

Meets MORE of the needs of MORE of the farmers MORE of the time!

Ideas for the Farm

FOR MORE INFORMATION ON IDEAS DISCUSSED HERE, SEE END OF COLUMN

Bright Roof Preserver One coat of asphalt-aluminum costs little, lasts a long time, and has the extra advantage of reflecting summer heat—important in keeping livestock healthier. Use it on rolled asphalt or rustable metal roofs. And when you buy, look for the Warranty Seal that assures the right amount and grade of aluminum pigment in the right vehicle. Ask your dealer for his "Warranty" brand. Folder sent on request.



Pasturage Is A Money Crop if you count the cost of supplemental feed. To cut that cost, use a portable irrigation system. Pastures stay green from early spring to late fall. One test shows cows get 35% more grazing, produce 35% more milk. Portable irrigation systems extend the growing season of all crops. When you buy, insist on strong, rust-proof Reynolds Aluminum pipe . . . weighs only 16 lbs. per 20 ft. length. Illustrated 12-page folder on irrigation sent on request.

Locker Plant Operators know the best way to wrap foods for freezing. They do it quickly, with no taping or tying, because they use Reynolds Aluminum Locker Wrap. These experts will tell you the end-result is better...practically no shrinkage or flavor-change. Cannot absorb juices or stick to product. Economical. Insist on this aluminum foil in your freezing. Illustrated folder on request.

.....

FARM INSTITUTE Reynolds Farm Institute,
Box 1800-C5, Louisville 1, Ky.

Please send literature on: Irrigation ☐; Locker Wrap ☐; Insulation ☐; Roof Coating ☐; Corrugated ☐; 5-V Crimp ☐.

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Moving Day Comes Regularly with your portable hog houses, chicken shelters, etc. They're much easier to move if built with aluminum roofing and siding. Yet this lighter metal has the solid strength you want on big barns, too. Wherever you use aluminum you can depend on lowest maintenance—no painting. Your poultry and livestock will be healthier because it's cooler under aluminum. Ask your dealer for Reynolds Lifetime Aluminum Corrugated and 5-V Crimp. Folder on request.

Turn Off The Heat is just what you want to do to keep milk or egg production up in summer, put weight on hogs. And that's just what you do with Reynolds Aluminum Reflective Insulation, tacked or stapled under roofs and inside walls of barns, poultry houses, hog shelters—or your own home. Aluminum foil on kraft paper, it reflects up to 95% of radiant heat. 250 sq. ft. in one 15-lb. roll. See your dealer. Ask for free folder.

Military requirements for aluminum affect total supply of these products. But production capacity is expanding. Keep asking your dealer.

Anyone Remember This Fence?

Sirs:

At about the turn of the century (some time between rail fences and the present woven wire fence) there was another kind of fence that, the writer feels, deserves mention in fencing history. When rails became scarce there was a demand for some kind of general stock fence. This demand inspired a lot of thinking about fences and resulted in many kinds of general stock fences being patented. Some of them were flimsy affairs with 6 or 7 line wires held together with stays, about the heft of a lath, which fell off in high winds. Others were sturdy and lasted many years. Some farmers, discouraged by the high cost (about 40c per rod) of the better fences, planted hedge. The writer has over a mile and a half of these "monstrosities" on a recently acquired farm and when the tractor gets tangled up in one of them the driver seems to forget his Sunday School lesson.

My father was a fence contractor at Thorntown, Indiana, at about the turn of the century and built many miles of his patented fence in that territory. It was one of the better fences and stood for many years. There were ten line wires in his fence spaced about like the present woven wire and held together with inch square stays with grooves for the line wires. The stays were wired to the line wires with short pieces of wire about the gauge of baling wire. This was quite a job and Dad built a small machine which fastened these stays on quickly and neatly.

When woven wire came out, of course, these patented fences went out of existence. However, because the ideas that came to light, and were patented in those days, contributed much to the present woven wire fence, the writer feels that they deserve their place in American Fencing History.

Carl G. Cones

South Bend, Ind.

The Prolific Mule

Sirs:

Being a Farm Quarterly regular since '47, I recall the article about the mule and the definitions of the mule family. Some time ago I happened to come upon the enclosed text. It is from an extensive old Dutch work on natural history (edited in Amsterdam, 1801). It gives in detail "The case of a female mule" sired by two different stallions and having had 6 foals (4 female, 2 male). All this between August 1763 and April 1776 in the stables of Fr. Carra, inhabitant of Valencia, Spain.

Since these cases are rare I thought both you, the writer and interested readers had to know about this.

Mr. B. R. van Wulfften Palthe

Eindhoven (Netherlands)

64 NATUURLIJKE HISTORIE

VAN DEN MUIL-EZEL.

VOORBEELDEN VAN EENE VRUGTBAARE KOPPELING VAN DEN MUIL-EZEL MET HET PAERD.

Wij hebben op verscheiden plaatsen van ons werk, en vooral daar wij over de muil-ezels in het bijzonder handelen, gezegd dat de Muil-ezel somtijds voortteelt, vooral in warme luchtstreken. Bij de voorbeelden, welke wij 'er van bijgebragt hebben, komt nu bij, dat een echt verhaal voegen, dat de Heer SCHIES, Consul van de Staaten-Generaal der Vereenigde Nederlanden te Murcia in Spanje, de goedheid gehad heeft mij, in het Spaansch geschreven, toetezenden, en waarvan hier eene vertaaling volgt.

„ In het jaar 1763, den tweede Augustus, des avonds ten agt uuren, wierp bij den Heer FR. CARRA, inwooner van de stad Valencia, een van zijne muil-ezelinnen, zeer wel gemaakt en bruin van kleur, die door een fraai grauuw paerd van Cordua gedekt was, een zeer fraai merrieveulen, roo van kleur met zwarte manen; dit veulen werd zeer fraai en was in staat om onder den man gebruikt te worden, toen het dertien half jaar oud was. Men bewonderde het te Valencia, want het had alle de hoedanigheden van een fraai dier van het zuiver-paerden-ras; het was zeer levendig en wel ter been; men heeft 'er den eigenaar zes honderd kroonen voor geboden, maar hij heeft het nooit willen verkoopen. Het theri denkbijk van eene verhitting, omdat het te zeer afgereden, of te vroeg bereden was.

With a New Holland "77" you can package up to 10 tons of hay an hour in firm, nutritious bales.

New Holland's "77" is tops in baling—gets the job done in a hurry!"

says A. G. Rolfe, Spring Valley Hereford Farm, Poolesville, Maryland

"WE WORK 1100 acres on Spring Valley Hereford Farm," says Mr. Rolfe, "and about three quarters of that acreage is in grass. We also carry over 500 head of Herefords and that means a lot of hay to put up. So we really need a baler we can depend on. We have it in the New Holland "77."

"For my money, New Holland's "77" is tops in baling and it certainly gets the job done in a hurry. Just start her up and she keeps on going field after field all day long. I know the "77" puts up hay faster than most balers and I'm convinced it puts up better hay, too.

"I've used New Holland balers since 1940 with great success and I have nothing but praise for the new "77"."

Spring Valley Hereford Farm

If you put up hay, you ought to consider owning a New Holland "77". Here's why:

Faster Baling—With a "77", you can bale *up to 10 tons* of hay an hour at the rate of 7 bales a minute! No other baler works faster. Now it's possible to bale your hay the day it reaches peak quality—avoid damage by sun or rain. Custom balers, men who count on speed, prefer the "77"

Lower Maintenance—The simplified design and rugged steel construction of the "77" cut maintenance to a fraction. A survey of 500 "77" owners showed repairs and maintenance that averaged only $21.40 for an entire season. Some had none!

Higher Feed Value per Bale—Baling action on the New Holland "77" is gentle. Protein-bearing leaves and blossoms are kept in the bale—not shaken out into the field. This means up to 50% more feed value for your stock.

More Experience—New Holland pioneered the automatic twine-tie baler. No other manufacturer has had as much or as long experience in this field. Today, New Holland is the leading manufacturer of automatic pick-up balers.

Better Service—New Holland dealers keep a complete inventory of spare parts on hand at all times to assure immediate replacement. Their servicemen are factory trained for expert emergency field service and off-season overhaul.

New Holland Twine for top-capacity baling! New Holland twine is fast-running, easy-knotting and strong. Because of its uniformly high quality, it has been awarded the U. S. Testing Company's Seal of Approval.

See your New Holland dealer soon for a complete outline of the "77's" outstanding features. And if you're in the market for a *wire-tie* baler, ask him about New Holland's Model "80". It gives you up to twice the capacity of other wire-tie balers now on the market. The New Holland Machine Co., a subsidiary of The Sperry Corporation.

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"First in Grassland Farming"

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- ☐ Wire-Tie Baler
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- ☐ Forage Harvester—Row Crop or Hay unit
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- ☐ Side Delivery Rake
- ☐ Tractor Mower
- ☐ Portable Tractor Saw
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Name_____

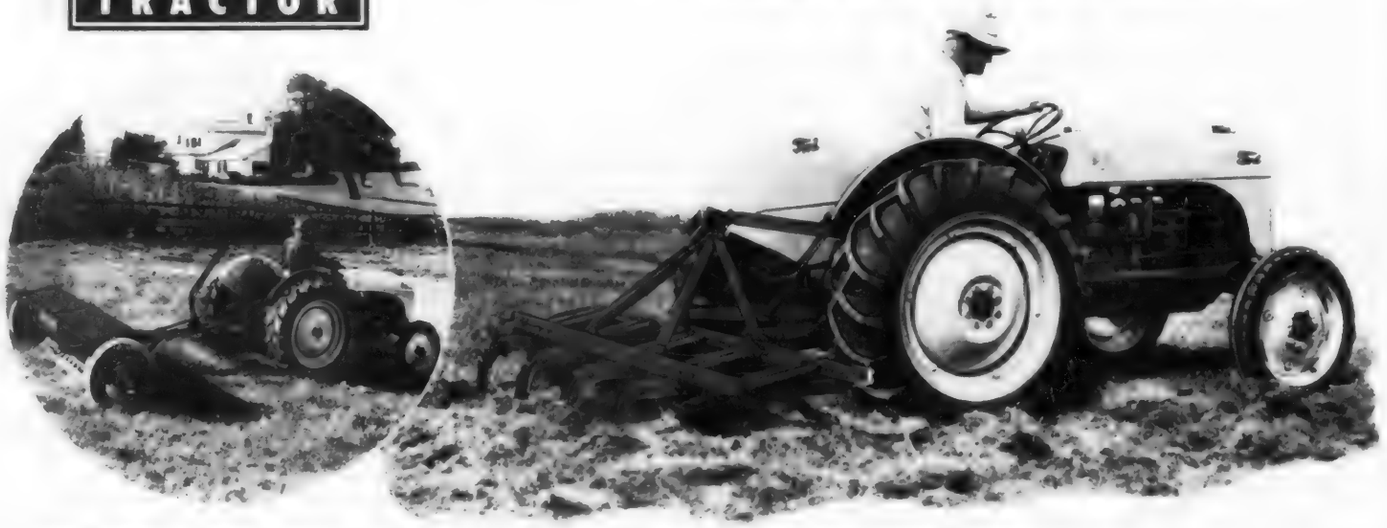
Street or RFD_____ Acres Farmed?_____

Town_____ County_____ State_____

Here's how to make richer pastures with the FORD TRACTOR

(PRICED TO SAVE YOU $50 TO $500)*

Ford TRACTOR



Make Pastures Grow Faster with Dearborn Lime and Fertilizer Spreader. Has strong ½-ton capacity hopper of heavy gauge steel; split disc agitator for positive feed; full floating scatter boards for even feeding; easy feed-rate regulation. Eight-foot spreading width.

Renovate "Root-Bound" Sod with Dearborn Field Cultivator—cultivate alfalfa or summer fallow—chisel dry ground to admit moisture—control field and pasture weeds with it—do stubble-mulch tillage to fight wind or water erosion. Attachable to the Ford Tractor in a minute or less!

What the Name *Ford* on a Tractor Means to You!

LOW FIRST COST

LOW OPERATING COST

GOOD SERVICE EVERYWHERE

PARTS ALWAYS AVAILABLE

MODERN DESIGN AND ENGINEERING

QUALITY CLEAR THROUGH

TOP VALUE AT TRADE-IN TIME

Changing run-down acres into productive, profitable pasture is no trick at all when you own a Ford Tractor and the Dearborn Equipment engineered to work with it. And, then, protected by well-established sod, your soil can resist erosion and gain in stock carrying capacity, year by year.

Whatever needs to be done—like chiseling to admit moisture, subsoiling for drainage, fertilizing, controlling weeds and brush—can be done the easy way with this great tractor and implement combination. It gives you all the advantages of built-in hydraulic control, of easy handling and economical power. It's easy, too, to do other pasture improvement jobs—such as digging a stock pond, building fences, filling gullies, throwing up terraces.

About all *you* do is steer and occasionally raise or lower implements by finger-touch hydraulic control.

Richer pastures are but one *plus* benefit of the Ford Tractor. Naturally, it has similar outstanding advantages for other types of farming. All this at a price *that's from $50 to $500 less than other leading 2-plow tractors.** Visit your nearby Ford Tractor dealer soon and see proof of all this!

DEARBORN MOTORS CORPORATION • Birmingham, Michigan

National Marketing Organization for the Ford Tractor and Dearborn Farm Equipment

Dearborn FARM EQUIPMENT

***Comparison of suggested list prices of the standard Ford Tractor and other leading standard 2-plow tractors priced with hydraulic lift.*

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Ford Farming MEANS BETTER WORK . . . MORE PRODUCTION

make your own weather . . . cure crops perfectly with a

HARTZELL INDIRECT-FIRED Crop Drier

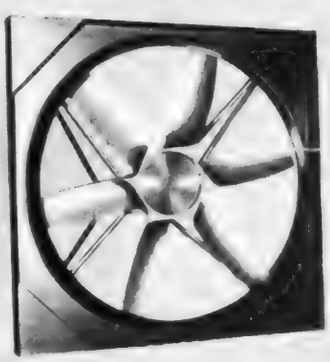
When you have a Hartzell crop drier you harvest when crops are at their peak . . . regardless of the weather . . . regardless of moisture content. Hay, corn, wheat, rice . . . *any* grain.

You dry 'em in the mow or crib. No weather-risk. No bleaching or shattering of hay. No grain mold, no rot. Better, brighter color; much higher feed value. Definitely improved sales value.

The Hartzell Indirect-Fired Crop Drier is compact, rugged, foolproof, safe, complete. Easily portable by tractor or automobile, and hooked up in a jiffy.

Drop us a line. We'll be glad to send details. (If you're a dealer, let us know. Your customers will like *this* crop drier)

OTHER HARTZELL DRYING FANS



Hartzell makes a full line of agricultural fans for crop drying, barn and poultry house ventilation, and other farm tasks. Hartzell drying fans include sizes and types to fit the needs of every farm. They are especially designed to operate with practically no attention, at low current cost.

A size and type for every purpose

HARTZELL PROPELLER FAN CO.

DIV. OF CASTLE HILLS CORP.

AGRICULTURAL DIVISION

PIQUA, OHIO

NONE AS GOOD AS THE FOX

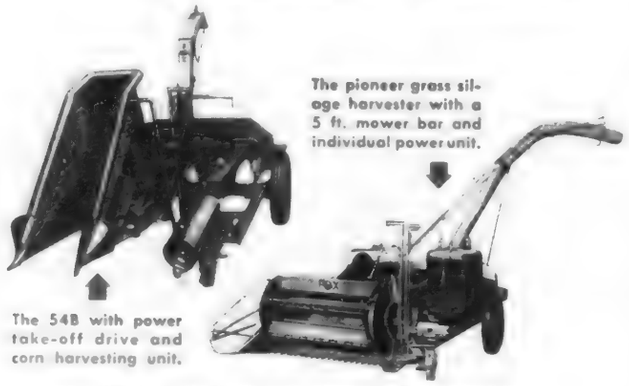
The Harvester

TO WHICH ALL OTHERS ARE COMPARED

. . . comes equipped with either POWER TAKE-OFF DRIVE OR OWN POWER UNIT.

The NEW FOX FORAGE MASTER can be changed to mower bar or corn unit in less than 10 minutes

The FOX Forage Master is not an experiment, but a field proven, time tested machine with a record of over 20 years of outstanding performance on thousands of American farms. The New FOX Forage Master is a further refinement of the original FOX, not one that has just been developed and that will require years of experience to perfect. You can depend on the FOX, the Pioneer of all Forage Harvesters. Remember! The FOX is the standard of comparison among forage harvesters.



The pioneer grass silage harvester with a 5 ft. mower bar and individual power unit.

The 54B with power take-off drive and corn harvesting unit.

Write today for New 1952 catalog.

—FOX RIVER TRACTOR COMPANY—

The Pioneer of Modern Forage Harvesting

5652 North Rankin Street

APPLETON FOX WISCONSIN

DAIRY BARN

How Many Meals a Day? When our county agent dropped in not long ago to pass the time of day we put him to work. "How many times a day should I feed my cows hay?" we asked him. "Most people feed twice a day at milking time," he answered, "but I'll ask around and let you know what our good dairymen are doing."

A week or so later he turned up with some amazing answers —some good dairymen feed hay as many as six times a day.

One man said that he tossed his milkers some nice green baled hay every time he went in the barn, which was usually six to eight times during the day. "I have the idea," he pointed out. "that cows are like children. If you serve them a big plate of food at a meal, they turn up their noses at it just to be contrary. But if you let them think they are getting something extra in between meals. it tickles their vanity. They always seem to clean up the small quantities of hay I give them during the day."

He may have something there, because he has one of the higest producing herds in the county. Apparently a dairyman can feed hay profitably as many times during the day as he wants.

Paper Pulp Feeds The sawdust piles that dot cut over woodland areas have long attracted the interest of chemists looking for cheaper sources of carbohydrate for livestock feed. The tough, slowly-soluble lignin in wood has, so far, been so difficult to remove that these huge reserves of sawdust have remained largely unused. In Scandinavia, during the late war, much cattle feed was made from sawdust, but the process was too expensive to use except in a pinch.

Straw and corn stalks lack lignin and a new process developed by an English paper mill can raise their feed value to nearly that of whole oats. The process uses sulphuric acid and caustic soda and is similar in many ways to that used in the production of paper pulp. 100 tons of straw yield 35 tons of fodder pulp and 25 tons of sugar extract, both suitable as feed for cattle or hogs.

At this time there may be little need for "paper pulp" feed in America, since we are still burning corn cobs which have proved to be good feed when they are ground as fine as three-eighths of an inch or smaller. If the sticky lignin could be economically separated from the cellulose in sawdust and timber slash we might produce another low cost stock feed.

Wheat for Dairy Cows A neighbor of ours ran out of corn last spring and figured he would piece out with some low grade wheat he had on hand. He had a heck of a time finding out how to feed it to dairy cows. Finally, he learned that the Australians feed it regularly to their cows and find it very fine feed. It's about as good as corn if handled properly and can also replace barley and other grain on a pound for pound basis in the rations of poultry and pigs.

In feeding it to cattle the big danger is that, if too finely ground, it balls up into a doughy mass in the rumen and can't be brought up with the cud. It's likely to sour down there and give the cow a stomach ache.

The trick is to mix enough loose bulky stuff with it to keep it from balling up. This stuff can be chaff of any kind, chopped hay, bran or hulls in about the proportion of one pound of chaff to four pounds of wheat. If this mixture is fed with good hay the ration will be sufficiently high in protein, although better milk production results from feeding it with a high protein meal such as meat meal or linseed meal or three pounds of linseed meal to five pounds of ground wheat. If good hay is available you will substitute in proportion to two pounds of hay to one pound of ground wheat. Where green pastures are available the proportion of wheat can be cut down. Beef cattle do pretty well on it if fed as the only concentrate with plenty of legume hay for roughage.

SuperSol Cuts Calf Starter Costs in Half!

Add SUPERSOL to the feedstuffs you have on your farm. You'll have an unexcelled calf starter!

A SUPERSOL calf starter gives you two BIG advantages. First, it costs about half as much as most calf starters. Second, SUPERSOL-fed calves grow faster. Here's the evidence.

PROOF OF SUPERSOL SUPERIORITY

Compare costs yourself. You already have 80% of the SUPERSOL starter on your farm . . . corn, oats and oil meal . . . or any palatable fitting feed. SUPERSOL comprises only 20% of this starter ration. Furthermore, you do not sacrifice feeding advantages when you reduce your starter costs by using SUPERSOL. Actually, the growth and development of SUPERSOL-fed calves is superior to calves fed other starters.

In university tests conducted over 2 successive years, calves fed SUPERSOL with grain and oil meal grew 15% faster than the standard rate of growth for the breed. Jersey calves gained 107 lbs. in 16 weeks. Calves, in these tests, received fluid milk for only 7 weeks.

SUPERSOL IS A NATURAL CONCENTRATE

SUPERSOL is derived from the yeast fermentation of grain. It is one of the richest *natural* sources of the B vitamins . . . and, in addition, it contains guaranteed high levels of vitamins A and D. These are the nutrients most essential to the health and growth of calves. SUPERSOL is also rich in proteins and trace minerals.

A little SUPERSOL gets big results. In a calf starter use only 20% SUPERSOL . . . one-fifth of the total grain ration. For creep feeding growing heifers, 10% is recommended. Just remember . . . a fair trial will convince you that SUPERSOL *is the secret of a superior ration.*

SUPERSOL is equally valuable in swine and beef cattle rations!

SUPERSOL

The Natural Supplement for All Livestock

Write for FREE Booklet

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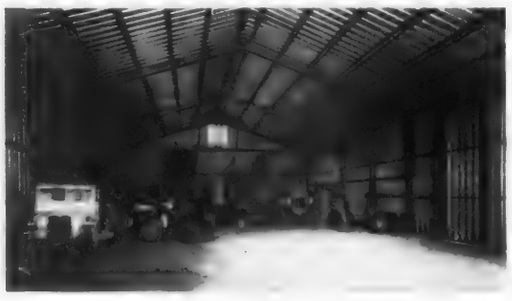
at LOUISVILLE *in* KENTUCKY

All-Purpose Farm Buildings Quickly...at Low Cost

Two Butler Buildings used as feeding and loafing barn at Geneseo, Ill., with 4-foot space between buildings for feed trough direct from silo.

This Butler open-front utility building, near Stillwell, Kans., is in use as an implement shelter . . . can be quickly converted to livestock shelter.



Straight sidewalls, column-free construction provide plenty of room for storing farm implements in this 40 'x80 'x14 ' Butler Building, Dodge City, Kans.

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Here's a quality building you can be proud of . . . a real addition to the permanent value of your farm. Cost—down to earth; usefulness—unlimited. And Butler Buildings give you these advantages.

1 Fire-safe (low insurance rates)
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Improve *your* farm with Butler Buildings. See your Butler dealer, or mail coupon below for full information.

Straight Sidewalls . . . Use All the Space You Pay for

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Long Grass, Short Grass? One of our dairyman friends got to wondering if he had the right answer to why his cows fell off when he still had plenty of grass in his pastures. He spent several sleepless nights out in the pasture with a stop watch and came up with some amazing facts about the grazing habits of a cow. He concludes that, even though his pastures had enough grass in bulk, a cow is too darn lazy or stubborn to put in extra hours eating short grass. He found that a cow will put in an average of 7½ hours every day eating whether it's on short grass or long grass.

LONGER GRASS will generate more milk.

On 5-inch grass in the 7½ hour period a cow can get 125 pounds inside of her; that is enough for 50 pounds of milk. On 2-inch grass, during the 7½ hour period, she can eat only 45 pounds, which is enough for only 20 pounds of milk. She just won't put in extra time to eat more grass to make more milk, which doesn't do her much good in the end, because it is taken away from her by the farmer.

This mathematical dairyman found out some other things about how cows eat—interesting but not very important. They divide this 7½-hour-day into two shifts, 4½ hours during the day and 3 hours during the night. They walk 2½ miles during the day and a mile and a half during the night.

A good cow will take 70 bites a minute. Over in Scotland they time all their cows. Any cow that takes less than 50 bites a minute is headed for hamburger. The moral seems to be to keep your pastures up to 5 inches or more.

Perverted Appetites A Missouri farmer writes in to tell us that his calves had been eating the hair right off his mules' tails. Dousing the tails in axle grease didn't do any good—the calves kept on eating, grease and all. Taking the calves away from the mules would have saved the mules' tails, but wouldn't have solved the calves' problem. A neighbor suggested to this Show-me farmer that since phosphorus deficiency sometimes causes cattle to go on strange eating sprees, he might try adding a little bone meal or disodium phosphate to his calf feed, which he did, and the calves promptly lost interest in mules tails.

Any time you see a calf munching off a feed rack, licking machinery or walls, or gnawing on handy parts of other animals, look out for a deficiency in the feed, generally a phosphorus deficiency.

If you believe in fair trial—

Try a new De Laval Sterling Milker Unit on your present milker pipeline in your own barn... on your own cows! Be your own judge... without obligation!

Get the FACTS... compare the milking performance ... ease of handling... the way your cows milk out ... the easy-to-clean features... of the De Laval Sterling Milker with whatever milking machine you are now using. Only *direct comparison* can give you the real story on De Laval Milking. It costs you nothing to *know the truth*... and may *save* you plenty. Just ask your local De Laval dealer to loan you a new De Laval Sterling Milker unit to make the "De Laval Milker Direct Comparison Test." Then... be your own judge... because *performance—not promises*—is what really counts! Direct comparison reveals the FACTS!

De Laval

MAIL THIS CARD TODAY

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PLEASE SEND ME THE NAME AND ADDRESS OF MY NEAREST DE LAVAL DEALER AND ADVISE HIM THAT I WOULD LIKE TO TRY A NEW DE LAVAL STERLING MILKER ON MY PRESENT MILKER PIPE LINE, TO MAKE THE "DE LAVAL MILKER DIRECT COMPARISON TEST."

NAME.....

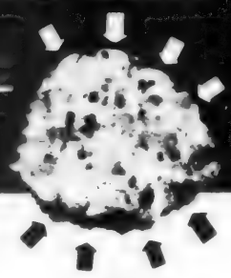
TOWN.....R.F.D.....STATE.....

MAKE OF PRESENT MILKER.....

30-F

STONEMO GRANITE GRIT

make feed produce more ... at less cost



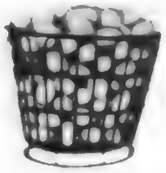
Yes, Stonemo's extra grinding surfaces can help your birds grind out more meat or eggs per pound of feed. Buy the best feed and give your flocks Stonemo . . .

HERE SIZES STONEMO HARD GRIT MAGNIFIED 5 TIMES

FOR PULLETS OR BROILERS

Stonemo helps pullets and broilers make better use of the body-building nutrients in your mashes. Leading broiler growers report increased feed efficiency upward to 5 pounds of meat per 100 pounds of feed when Stonemo is a part of the feeding program.

FOR LAYING HENS



Stonemo helps your laying hens produce more eggs per pound of feed. In a midwestern university, experiments adding insoluble grit to whole grain and mash feeding averaged 7% more eggs with 6.3% less feed—with all mash rations, 6% more eggs with 3.2% less feed.

FOR FAST-GROWING TURKEYS

Stonemo, in the amount of 3% to 5% of feed consumed, helps you get your turkeys to market faster at less cost. Whether you raise turkeys for fryers or full weight, experiments show you can cut your feeding time per given weight, and step up your profits.

FREE
STONEMO SELECTOR
Tells you how to choose the right size Stonemo Granite Grit for every stage of growth and production: Chicks—Pullets—Broilers—Laying Hens—Turkeys. SEND FOR YOUR STONEMO SELECTOR TODAY.

Be sure Stonemo Granite Grit is a part of your feeding program. Use it as recommended to help save feed dollars. Get Stonemo from your local feed or poultry supply dealer.

STONE MOUNTAIN GRIT COMPANY, Inc.

Executive Offices & Quarry, LITHONIA, GEORGIA
Dept. FQ-SU

Poultry Yard

A New Way to Stop Feather Picking English poultrymen are attacking the old problem of feather picking in typical British fashion—by appealing to the good taste of the birds. A bitter solution, sprayed onto the feathers, is said to stop feather picking in much the same fashion that quinine under a youngster's finger nails stops thumb sucking. The spray is produced by mixing a pound of unground quassia (sometimes called bitter wood) with ten gallons of water and a wetting agent such as one of the household detergents or an ounce of sodium lauryl sulfate. After steeping for 24 hours the mixture is ready. The low-pressure spray is applied to the abdomen and vent of each bird at weekly intervals for two or three weeks. The spraying is usually done at night when the birds can be picked off the roost. Feather picking stops immediately, the skin wounds clear up, and new feathers begin to grow.

Other methods which have been used to stop feather picking and cannibalism are:

(1) Increase the salt content of the diet for two or three days. If an all mash diet is fed, two per cent of salt should be added; if mash and grain are fed, four per cent of salt is added to the mash.

(2) Cut, with a sharp knife or burn with a soldering iron about three-sixteenths of an inch from the upper beak of the birds. If care is taken not to reach the quick, this operation can be painless.

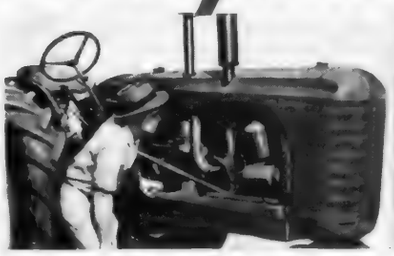
(3) Color the window panes of the poultry house red.

(4) Increase the protein in the diet and add barley and wheat bran.

(5) Fit the birds with one of the many anti-pick devices on the market.

More Eggs From Crossbreds New evidence that cross breeding chickens increases their rate of growth, egg laying, and length of life, comes from experiments conducted by F. Ghostley and A. W. Nordskog at Iowa State College. These scientists made every possible mating cross using eight separate strains within four breeds of chickens. The breeds used were Australorps, New Hampshires, Barred Rocks, and Rhode Island Reds and within each breed there were two separate strains. At the end of eight weeks, the chicks resulting from crossing breeds averaged two ounces heavier than the purebreds and one ounce heavier than the chicks resulting from strain crosses. The crossbreeds and the strain crosses reached sexual maturity 10 days earlier than the purebreds, laid nine per cent more eggs, and had a ten per cent lower mortality.

Everywhere you look...



Under the Hood

Notice the *size* of these Massey-Harris power plants! There's no skimping of materials or workmanship here. That's why big, high compression Massey-Harris engines deliver *more* power and get *more* work done on each gallon of fuel than any other leading make of tractor . . . and last longer. Impartial tests prove this. Operating costs are lower — your profits greater, when you own a Massey-Harris.

Up Front

Check Massey-Harris quick-turning, shock-proof steering. *Three* teeth of the steering sector are always engaged with the worm — distributes wear and shock over more area —eliminates backlash and steering "whip." Castor-set wheels steer easier. Free rolling super-sealed wheel bearings last longer. You end the day fresher, with more acres covered with a Massey-Harris.

At the Controls

You'll ride smoother on the Velvet-Ride, hydraulically mounted seat . . . stand up more comfortably on the full-width platform . . . turn and stop easier with the positive light pressure brakes . . . see ahead better over the streamlined hood . . . operate the instant-reach controls quicker, including two-way Depth-o-Matic hydraulic system that powers tools into the ground as well as out.

You get more in a Massey Harris

THE more advantages you look for, the more features you check, the more reasons you'll find for owning a Massey-Harris! Impartial tests prove that in power, performance and economy, Massey-Harris tractors lead the field.

But the advantages of farming with a Massey-Harris don't stop with the tractor itself. You are also ahead with the tools you can mount on your Massey-Harris tractor. There's a full line of matched equipment for every farming need. Years ahead in design, Massey-Harris mounted tools attach quicker, adjust easier, last longer, and do better work under a wide variety of conditions.

No matter whether you farm 50 or 5,000 acres, you can enjoy the performance of Massey-Harris tractors. There's a size to fit your needs — 6 power sizes and 31 models. So look over the complete line of Massey-Harris tractors and equipment at your nearby Massey-Harris dealer. Ask for a demonstration on your own farm. See for yourself why more and more farmers find it pays to "Make it a Massey-Harris" . . . why Massey-Harris is the fastest growing full line farm machinery company. For complete tractor catalog by mail use the coupon below.

Make it a Massey-Harris

MASSEY M·H HARRIS

THE MASSEY-HARRIS COMPANY
Quality Avenue, Racine, Wis., Dept. F-222
Please send me a copy of your latest catalog that shows all the features of Massey-Harris tractors.

Name .....
Town ..... R.F.D. .....
County ..... State .....

Increase Your Profits with Small Investment

Bank Your Grain

Butler Grain Bins

When you bank your grain in a weather tight, rodent-proof Butler Grain Bin, you're bound to increase your profits. Year after year, more and more farmers find it pays to hold their grain beyond harvest time to sell later at a higher market price. *And remember, more farmers are using Butler Grain Bins than any other make.*

Add Pounds to Your Stock

Your stock will gain weight faster and be healthier when you give them plenty of fresh, clean water from a Butler Stock Tank. Don't run the risk of illness and vet bills. Increase your livestock profits with Butler Stock Tanks. "Big Ham" Automatic Fountain lets small and large stock drink from same tank.

Butler Stock Tank

Your Hogs Grow Bigger, Faster

Butler "Big Ham" Hog Feeder

Increase your hog profits in a hurry this easy way—feed your porkers from a "Big Ham" Hog Feeder. Sixteen openings in circle let even largest hogs get their fill, leisurely. Deep troughs, well covered, stop feed wastage; cut feed bills. "Big Ham" means big hog profits to you — buy one *soon*.

BUTLER STEEL PRODUCTS

BUTLER MANUFACTURING COMPANY
KANSAS CITY, MO.
Galesburg, Ill. Richmond, Calif. Birmingham, Ala. Minneapolis, Minn.

Get the Facts—Mail Coupon Today

For prompt reply, address
7378 E. 13th St., Kansas City 3E, Mo.
978A 6th Ave., S.E., Minneapolis, Minn.
Dept. 78A, Richmond, Calif.

Please send me complete information on the following products in the Butler Blue Ribbon Line of Farm Equipment.

Name_____

P.O._____

R.F.D._____ State_____

- ☐ Grain Bins
- ☐ Stock Tanks
- ☐ Hog Feeders
- ☐ Farm Fuel Tanks
- ☐ Corn Cribs
- ☐ Well Casing
- ☐ Feed Pans
- ☐ Auger Grain Loaders

THE FARM'S PICTURES

A number of photographs in the Summer issue of FARM QUARTERLY were taken by a newcomer to our staff, and also a newcomer to this country. Kazik Pazovski, shown above on an assignment in Ischia, Italy, has for the last five years been recognized as one of England's most imaginative photographers. He lived in London after being discharged from the British Navy, where he served as an officer on the Polish destroyer "Burza." Pazovski was born in Vilna, Poland, and he was living there at the outbreak of the War.

COVER BY TOM P. LAKE

5—Werner Braun. 18—*USDA*. 30 and 31—Werner Braun. 32—T. D. W. Friedmann. 33—T. D. W. Friedmann; Werner Braun. 34 and 35—Joe Munroe. 36—General Electric; U. S. Weather Bureau.37—U. S. Army Photograph: General Electric; North American Weather Consultants. 38—Joe Clark. 40 and 41—Fred Knoop. 42—Arthur Lavine-*Black Star*. 43—Fred Knoop; R. J. McGinnis. 44—Winston Pote. 45—Joe Munroe. 46—Kazik Pazovski; Joe Munroe. 47—Joe Munroe; L. O. Gilmore-*Ohio Agricultural Experiment Station, Wooster*. 48—Isabelle Hunt Conant-*Philadelphia Zoological Garden*. 49—Bruce Snyder. 50—Charles Harper; U. S. Fish and Wildlife Service; Kazik Pazovski. 51—T. McHugh-*FPG*. 52—Steinmetz-*FPG*. 53—Carola Gregor-*Monkmeyer Press Photo Service*. 54—Jack McManigal: Don Hemrichs. 55—Jack McManigal; National Safety Council; SCS-*Monkmeyer Press Photo Service*. 56—Kazik Pazovski; R. J. McGinnis. 57—J. W. McManigal-*USDA-PMA-Neg. No. 231(FCI)*. 58—Courtesy, *Wayne Feeds*. 59—The Pfefferkorn Studio. 60—Courtesy, *The National Fertilizer Association, Washington, D. C.;* The Pfefferkorn Studio. 61—Kazik Pazovski. 62—U. S. Department of Agriculture, *Bureau of Entomology and Plant Quarantine*. 63—Carl Stapel. 64—Kazik Pazovski. 65—Edholm & Blomgren; J. C. Allen and Son. 66—Kazik Pazovski; J. C. Allen and Son. 67 through 69—Kazik Pazovski. 70—University of Missouri. 71—Joe Munroe. 72—Margaret A. Ahlers. 73—Carl Mansfield. 76—Standard Oil Co. (N.J.); USDA—Gordon S. Smith: Ralston Purina Co. 78—J. I. Case. 79—Farm Home Cover by Charles Harper. 80 through 83—Kazik Pazovski. 84—Plumbing and Heating Industries Bureau. 85—Plumbing and Heating Industries Bureau; Kazik Pazovski. 86—Courtesy, Fairbanks-Morse; Jacuzzi Pumps: Robbins & Myers; Flint & Walling Mfg. Co.: USDA; The F. E. Myers & Bro. Co.; Burks Pumps; Kazik Pazovski. 88—Courtesy, *The National Fertilizer Association, Washington, D. C.* 92—Kazik Pazovski. 96—Pittsburgh Plate Glass Co. 106—National Safety Council, Inc. 109—Herb McLaughlin-*Mercury*. 110—Sam Chambliss. 114—Bruce Snyder. 125—The Verkamp Corporation. 131—U.S. Weather Bureau. 134—Fred Knoop.

THE AUTHOR of "Go Fetch the Cows," Jean Bell Mosley, is a day-dreaming housewife who lets the beans burn while she tried to trap with words the charms of their planting and harvesting. Nostalgia for the Missouri Ozark farm where she was raised has resulted in many short stories and articles. Her first book, "Stone Valley," containing many pieces similar to "Cow Path" will appear next spring from Westminster Press.

Why these 2 SQUIBB SPECIALTIES are so popular with dairymen for treatment of MASTITIS

Note the *thorough dispersion* of Squibb ointment in a treated quarter.

Both of these SQUIBB specialties are enjoying tremendous popularity with dairymen everywhere!

Squibb "Instant-use" Penicillin Ointment has been a remarkable 3-year success! Dairymen have used it to treat millions of cases of mastitis. It is specially recommended for 80% of mastitis cases—those caused by Streptococcus agalactiae.

"Instant-use" Pendistrin* is the new Squibb specialty—a potent combination of antibiotics. It contains 100,000 units of penicillin and 100 mg. of dihydrostreptomycin. It is especially recommended for difficult cases.

Dairymen who watch mastitis closely—who take regular steps to keep it out of the herd—go a long way toward rolling up extra income. Help keep mastitis out by having both Squibb Penicillin Ointment and Pendistrin always on hand!

Write for literature on mastitis. Address: E. R. Squibb & Sons, Veterinary and Animal Feeding Products Division, Dept. FQ-SU, 745 Fifth Avenue, New York 22, N. Y.

For accurate diagnosis of mastitis, consult your veterinarian.

**Trade-mark of E. R. Squibb & Sons*

The dairyman buys!

Mr. Eldon Woodmansee of Converse, Indiana, talks to the proprietor of La Fontaine Drugs at La Fontaine, Indiana. Mr. Woodmansee has a troublesome case of mastitis in his herd. The druggist recommends PENDISTRIN.

He treats mastitis so easily!

"I found Pendistrin exceedingly simple to use," says Mr. Woodmansee. "I merely inserted the end of the tube projection into the opening of the teat and squeezed the tube's contents into the infected quarter. The ointment then was massaged upward into the quarter." This is *one* reason dairymen keep coming back for both of these Squibb specialties. Both are so easy to use! Both come in the infusion-tip "instant-use" tube, introduced by Squibb!

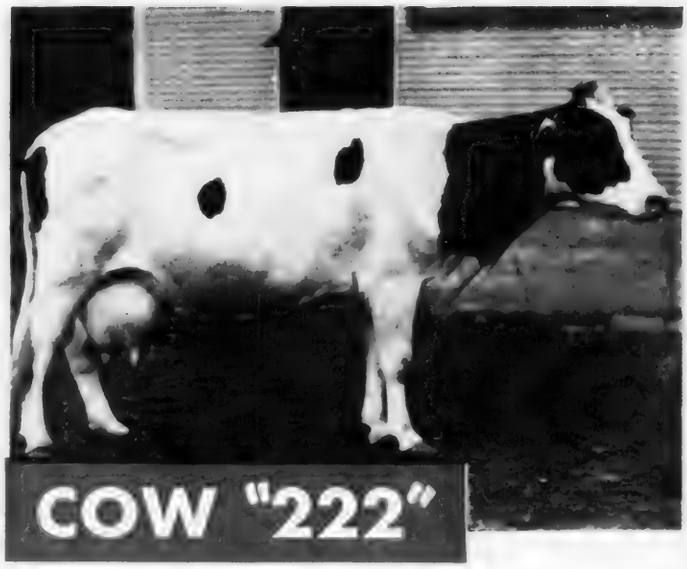
Milk production returns so quickly!

Later, Mr. Woodmansee is jubilant as he takes a full pail of milk from the recovered cow!

"Pendistrin is the fastest-working treatment I've found for Mastitis," says Mr. Woodmansee. "Two treatments a day, for two days, completely whip stubborn cases for me. It should be applied as soon as the mastitis appears and I keep tubes handy in the cow barn. Although I have used other penicillin treatments with success, Pendistrin is by far the best."

Effectiveness—that's another reason dairymen keep coming back for these two Squibb specialties—both Pendistrin and Penicillin Ointment!

SQUIBB — A NAME YOU CAN TRUST



Why Did Cow "264" Give Almost 2,500 lbs. More Milk than Cow "222"?

PURINA RESEARCH FOUND THE ANSWER

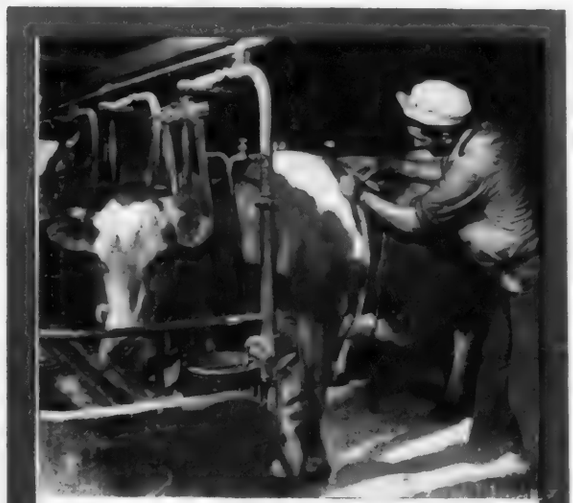
These two cows were used in one of the Nation's earliest experiments with dry cow rations. The test was set up at the Purina Research Farm 20 years ago.

Both cows had finished their fifth lactation and both were almost even in production. When we dried off cow No. 222 we "loafed her through" on pasture and odds and ends of grain ration. She lost 50 lbs. in condition. In her next lactation, she dropped almost 2,000 lbs. in production.

No. 264 was fed the best dry cow ration we could devise at that time. She gained 105 lbs. while dry and came through with an *increase* of 500 lbs. of milk in her next lactation. *The total difference was a little more than 2,500 lbs. of milk!*

This early test has been repeated in various forms on large numbers of cows at the Purina Farm. These tests have shown again and again that dry Holstein cows properly conditioned will give about a ton more milk in the next lactation than will cows not so well conditioned. Other breeds a little less according to fat test.

These pioneer experiments at the Purina Farm helped to start the big swing among better dairymen to special dry cow rations and special care for the dry cow. This is one of several advancements in feeding which have come from the world's largest commercial research farm — the Purina Farm at Gray Summit, Mo.



CHECK WEIGHT GAINS WITH THE PURINA WEIGHT TAPE. See if your dry cows are gaining as they should. Breed heifers by weight as shown by this tape. Just send 20¢ and the coupon. If you would also like a Purina Dairy Book telling about the Purina Plan of feeding dry cows for more milk and less calving trouble, check coupon for free copy.

CALVING TROUBLES HAVE BEEN REDUCED in many herds by conditioning dry cows on Purina D & F Chow or D & F Supplement and ground oats or barley.

LESS UDDER CONGESTION at calving is experienced in many herds when switched to the Purina Plan of conditioning dry cows. The right feed does make a difference.

RALSTON PURINA COMPANY
1128 Checkerboard Square
St. Louis 2, Missouri

.....Please send free Diary Book (D3200C)

.....Enclosed find 20¢ in coin for a Purina Weight Tape

Name.....

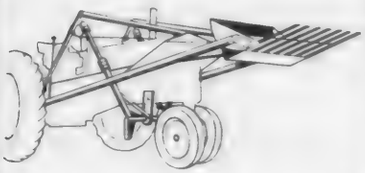
Farm Name.....

Address.....

Town.....State.....

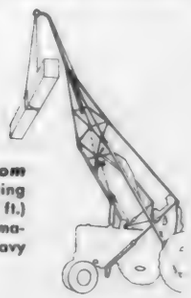
NEW IDEA-HORN Loader

Busiest farm tool you can own . . .

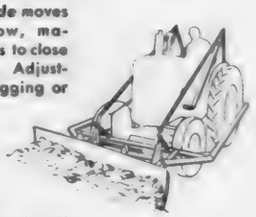


It's the NEW IDEA-HORN Loader — greatest labor-saver a farmer ever had! Lets you lift, scoop or doze loads of *more than a ton* from your tractor seat. Main frame and lift arms attached by four tapered pins. Frame is of cold-drawn, extra-strength seamless steel tubing. Three types available for wide range of tractor makes and models. Ten labor-saving attachments fit all three types of Loaders.

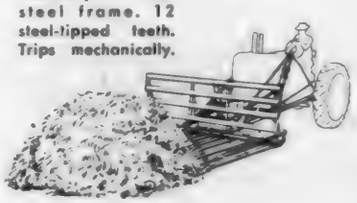
3 of the 10 Easy-on Attachments



Extension Boom permits high lifting (from 14 to 20 ft.) of logs, bales, machinery, other heavy loads.



Dozer Blade moves earth, snow, manure. Works to close tolerances. Adjustable for digging or levelling.



Buck Rake ideal for quick pickup and carry. 10 ft. all-steel frame. 12 steel-tipped teeth. Trips mechanically.

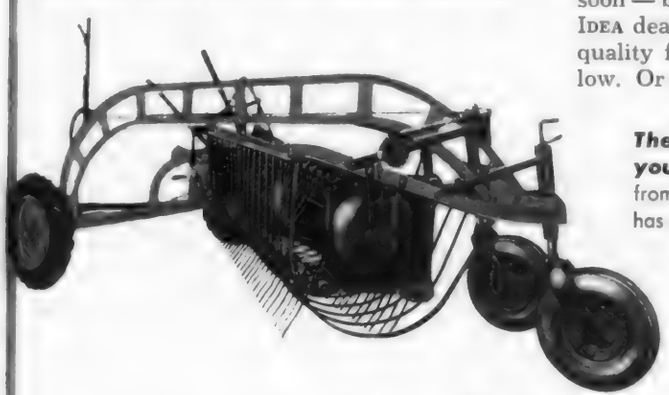
QUICKER CURE . . . LESS BLEACH . . . BETTER HAY!

Watch a NEW IDEA rake pick up hay, gently fluff it up into a loose, uniform windrow with leaf part in — away from the sun — stem part out. Leaves and stems cure evenly with less bleaching and shattering. Result: better hay in the barn in shorter time!

You will marvel at the way the double curved steel fingers of these NEW IDEA Side-Delivery Rakes lift up the heaviest down hay cleanly . . . or gently open up damp swaths as you move a lever that turns this rake into an efficient tedder.

These superior raking features add up to more protein saving — carotene saving — more digestible nutrients — feed that stock will clean up to the last spear.

That's why it will pay you to see these rakes soon — before haying starts. Ask your NEW IDEA dealer, too, about the other famous-for-quality farm machines listed in coupon below. Or send coupon for free literature.



There's a NEW IDEA Rake to meet your needs — two sturdy models to choose from! The low-wheeled rake, shown here, has husky 5.50-16 implement tires. The high-wheeled version, shown in top photo, is available with steel rimmed or rubber tired wheels. Both models are instantly reversible for tedding.

That's why a **NEW IDEA** *is a good idea!*

Mail Coupon today for free folders!

NEW IDEA FARM EQUIPMENT CO. SUBSIDIARY AVCO MANUFACTURING CORPORATION

Dept. 612, Coldwater, Ohio

Check free folders you want:

- ☐ Rakes & Tedders
- ☐ Hay Loaders
- ☐ Tractor mowers
- ☐ All-Purpose Elevators
- ☐ NEW IDEA-HORN Loaders
- ☐ All-Steel Wagons
- ☐ Steel Wagon Boxes
- ☐ Corn Pickers
- ☐ Corn Shellers
- ☐ Stalk Shredders
- ☐ Manure Spreaders
- ☐ Lime Spreaders
- ☐ Transplanters

Name_____

Address_____

AMAZING NEW "VEST-POCKET" ORCHARD

Healthful Fruit for Your Family All Year 'Round

GIVES YOU ALL YOU WANT FOR EATING • FREEZING • CANNING • STORIN

STARK GOLD CHERRY (Trade Mark). Sweet. Hardy. Survives toughest winters. **STARKING HARDY GIANT CHERRY.** (U. S. Patent) Sugary sweet, delicious. Bears Young, Heavy.

STARK GOLDEN DELICIOUS APPLE (Trade Mark). "Finest flavored apple in the world!" said Burbank. Tree bears enormous crops. (Available in Dwarf.)

✓ CUTS FOOD BILLS
✓ INCREASES PROPERTY VALUE
✓ BEAUTIFIES YOUR HOME

New Fruit-Landscape Colorphoto Catalog FREE

Filled with gorgeous color photographs of fabulous Stark Fruit and home-beautifying Stark Roses, Flowering Shrubs, Shade Trees, Vines. This Stark's biggest, most costly book . . . yours FREE!

STARKING DELICIOUS APPLE (Trade Mark). Startling improvement over Stark Delicious, which was World's No. 1 red apple. (Available in Dwarf.)

New **HAL-BERTA GIANT PEACH.** World's largest yellow peach. Some weigh 1 lb. each.

New **STARKING DELICIOUS** . . . famous Red-Flesh Plum. (U.S. Patent variety). Freestone, huge size, delicious flavor.

Stark's Exclusive New U. S. PATENT PROCESS Hardy Dwa
"Vest Pocket" Orchard (above) Bears Quicker—Often at 2 Y

6 sensational, new, hardy Stark Dwarf Apple trees (10 feet apart) need only 1 of ground. Families with very small plots now can have the same, full-size Sta pion Fruit from these amazing dwarfs. They bear faster; need no picking la wonderful anywhere. Ideal for landscape plantings. (Order "Vest-Pocket" Dwa tion No. 100.)

Just Like Having Big Baskets of Harvest-Fresh Fruit Delivered to Your Door Practically Free!

SUPPOSE a famous orchard started delivering beautiful baskets of delicious, big juicy HARVEST-FRESH apples, peaches, plums, pears, cherries, apricots, grapes, etc. right to your door every week—practically free! SO MANY baskets that you would have enough to SERVE YOUR FAMILY PLENTY OF HEALTHFUL FRUIT ALL YEAR ROUND—right out of your own pantry, cellar or freezer.

That's what It's like when you have one of these amazing new Stark Exclusive orchards. Yet one can be planted in almost any backyard plot.

Grocery Bills Dwindle—Bank Account Grows

As the proud owner of a Stark bargain Orchard, you can always have a big, cool, crisp APPLE that could win a prize at a County Fair! You can serve generous helpings of luscious FRESH PEACH SHORTCAKE or FRESH CHERRY PIE at practically no cost. You can be "famous" for your tempting FRESH APRICOT JAM or FRESH PLUM JELLY. Your family will enjoy keener appetites and more wholesome vitamin-filled meals. And your grocery bills get smaller—while your bank account gets bigger.

The retail value of the first crop from your Stark Orchard will often pay back MORE than the cost of the trees. And if you ever sell your place, fruit trees will add to the cash value. John Trevethan of Pennsylvania writes, *"I sold my house and lot and got $600 more for it because of the 6 good Stark Fruit Trees that were then loaded with fruit."*

These are the SAME TREES that commercial growers plant to reap the biggest profits. Andrew Miller of Oregon, for example, grossed $17,350 in just 6 years from only 165 Starking Delicious trees.

Luther Burbank

America's "Wizard of Horticulture" asked that Stark Bro's carry on his great work, and introduce his new Fruit Creations.

Only From Stark Bro's Can You Buy These Newest & Best Varieties

How can Stark Bro's offer fruits that are such vast improvements over the ordinary fruit trees that grew in Grandfather's yard? What is the secret of these fabulous patented varieties that bear years sooner; live years *longer;* yield *more—bigger—better-tasting* fruit? The full story is told in our FREE 1953 Catalog (see coupon below).

Mail Coupon for FR Colorphoto Catalo

Then you can appreciate how bea fruits are — how *much* a Stark Orchard can *do* for your home a This large book is over 1 foot lon with gorgeous natural color photo our 302 famous varieties of fru berries, shade trees, shrubs, vines

Included in this exciting new S photo Catalog for 1953 is a comple ative Home Landscape Planning ing Section . . . packed with idea fully prepared charts and informa exactly how and where to plan follow. This giant new 1953 Stark yours FREE . . . just fill out coupon *TODAY*.

New Stark Colorphoto Catalog Includes Big Home Landscape Planning Section!

Stark Colorphoto Catalog includes page after page of helpful, easy-to-follow plans, ideas and information for planning and planting. Shows how to add more BEAUTY and CASH VALUE to your home—just a few dollars worth of Stark extra hardy shrubs, vines, roses and shade trees can add up to $1,000 to the value of your home. Correct landscaping can make your place a home every neighbor will admire and envy. See for yourself . . . send for the new Stark Colorphoto Catalog, including the fascinating Home Landscape Planning section. Just sign and mail coupon today.

Sensational Stark DWARF FRUIT TREES Only from Stark Bro's can you buy these exclusive Trade Marked and Patented varieties. Stark U.S. Patented Quadruple-Life sensational new "Dwarf" Apple and Pear Trees make ideal flowering shrubs . . . none hardier and more sturdy . . . often bear in 2 years.

FREE MAIL THIS COUPON FOR 1953 COLORPHOTO CATALOG

STARK BRO'S NURSERIES & ORCHARDS CO.
Box 2183, Louisiana, MISSOURI FQ6-52

☐ Send me FREE your big beautiful new STARK 1953 COLORPHOTO FRUIT-LANDSCAPE CATALOG filled with gorgeous natural color photographs of your 302 varieties of Flowering Shrubs, Flowering Trees, Shade Trees, Vines, Shrubs, Roses, Fruit Trees, Berries —showing STARK Exclusive Patented Process HARDY DWARF and STANDARD FRUIT TREES. Containing new Stark Home Landscape Planning and Planting Guide.

☐ If you need 20 fruit trees or more, check here for facts on Growing Fruit for Profit.

Name.....

Street or R.F.D.....County.....

P.O.....Zone.....State.....

☐ CHECK HERE for Money-Making Sales Plans and FREE Demonstration Kit. Introduce Stark Super-Quality Varieties to friends, neighbors. Pleasant, easy work. Spare or full time. No experience needed.

STARK BRO'S NURSERIES & ORCHARDS
Box 2183, Town of Louisiana, MIS
—Up near the Iowa line—
Largest in World . . . Oldest in
8 Big Nurseries — East to W

Men and Women Wanted to Sell Stark Trees MAKE MONEY IN SPARE TIME

Turn your spare time into cash! Introduce famous Stark World's Champion Super-Quality Varieties in your locality — easy, pleasant work during evenings, Saturdays, any time. No experience needed. Everyone knows Stark Bro's, World's Largest Nursery, founded 137 years ago. Get big, colorful money-making sales outfit FREE. Shows you how to start earning first day you try. CHECK COUPON and mail today!

Check Bottom Box if YOU want to Make Spare Time Money!

Teacher Sells Spare Time John W. Simmons, W. Va., has earned big money spare time during past 21 years selling Stark Trees, Shrubs, etc.

Mother of 3 Earns $974.55 in Spare Time Mrs. Thelma Holman, Idaho, earned $974.55 last season in spare hours. More this year.

Farmer Sold $516.87 in 1 Month John Holdridge, New York a farmer, finds this work both pleasant and profitable.

Big Earnings in Spare Hours J. B. Johnson, North Carolina, during past 6 years, has sold over $7,000.00 worth of Stark Bro's Flowering Shrub, Fruit Tree, Vine and Rose orders.

LONG A DREAM ..... TODAY IT COMES TRUE ....

EAGLE HITCH Farming

Here's a brilliant new way of doing your farm work—with Eagle Hitch now built into big 2-plow and 3-plow Case Tractors. In mere minutes you switch from mounted Break-Away Contour Plow to lift-type harrow or planter, from toolbar tiller to mounted mower. You hustle along the highway and your Eagle Hitch Implements never touch the hard surface. You skip across sod strips or new seeding without your Eagle Hitch Harrow leaving so much as a scratch. You back into corners with a 4-section drag, shake trash from spring teeth at a touch of hydraulic control. You make short turns, quick stops with a gentle push on the new self-energizing double-disk brakes.

LIVE POWER TAKE-OFF

. . . lightens your work, helps save grain and feed, makes fuel go far and tractor last long. Now you can apply tractor power to wheels or PTO or both. You can keep your combine, forage harvester or other PTO machine going full speed, start and stop travel as desired. PTO clutch is on live-power shaft, independent of traction clutch.

LIVE HYDRAULIC CONTROL

. . . another time-saving advantage of Case Eagle Hitch Farming . . . is ready to act at any instant, moving or standing, when the engine is running. Live Hydraulic Control works with both mounted and trailed implements. In Case "SC" and "DC" Tractors hydraulic control, power take-off, and traction are all independent of one another.

HOOK UP SITTING DOWN

Eagle Hitch Farming is the sum total not only of a vastly superior way of mounting, driving and controlling implements, but also the fast-acting, shock-free steering—the dust-sealed, oil-cushioned clutch—the stamina, long life and low upkeep that have made Case Tractors famous. All these great qualities are now harmoniously built into the years-ahead Case Tractors for Eagle Hitch Farming. Visit your Case dealer now—see how Eagle Hitch Farming is fitted to farms of every size with the big 2-plow "SC" and 3-plow "DC" Case Tractors. You can swing this very day to such a satisfying, productive way of farming as you dared only dream of until now.

GET A PERSONAL DEMONSTRATION

After you've had a good close look at Case Eagle Hitch Tractors and Implements, arrange with your Case dealer for a personal demonstration on your own farm.

FIND OUT MORE ABOUT EAGLE HITCH FARMING

Case builds 25 great tractors and a full line of farm machines. Mark here or write in margin any you need. J.I. Case Co., Dept. F-90, Racine, Wis.

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FARMING

The new nation of Israel is making farmers out of teachers, lawyers, shopkeepers from fifty countries. Victory over the elements and unfriendly neighbors is on its way.

Abraham Negev stopped his tractor on the crest of the hill and looked across the valley toward the distant border, behind which lay the hills of Shomron. As if it were yesterday he saw himself and his family standing in the hot sunshine on the docks at Haifa. On that day he was worried and confused. One of the children was crying and his wife was running about, searching for a lost bundle.

Abraham looked up at the rusty plates of the British troopship which had brought them from the Cyprus immigrant camp. It had been a long time since they had left their home in Roumania, almost a year, he guessed; a year of living in the overcrowded Cyprus camp, waiting in endless lines for food. Worst of all were the harrassed officials, always in shabby uniforms, always short tempered. They seemed always to be about him, prying into everything he did, asking endless questions. Their rules and regulations baffled and confused him.

He remembered the superior look of the official in the customs shed when he told him he had been a shopkeeper all his life and wanted to be a shopkeeper in his new home. "We need farmers," the official had told him gruffly.

Abraham had held out his thin hands. "How can I handle a plow with these?" he had asked. "I know nothing about farming; I am a shopkeeper."

"We have too many shopkeepers," the official said. "We need farmers. If you aren't a farmer we'll make one out of you. It will not be easy for you to be a shopkeeper."

Abraham knew from long experience how useless it was to argue. Once he would have refused, but a year in the immigrant camps had humbled him. He wanted no more of camps, no more of waiting.

He shrugged his shoulders. "Okay," he said. "I'll be a farmer."

He signed many documents, none of which he read—

LEFT: The West meets the East in Israel. Here, since ancient times, Arab and Jews have lived side by side, sometimes at peace, sometimes in a bitter war. This is an Arab woman. She is a Moslem; her tribe does some primitive farming, but prefers the nomadic life, following the seasonal grass with its flocks. RIGHT: This might be on a Midwest farm, but these men are cutting sorgum silage on an Israeli farm. American farming methods and American machinery are pushing forked stick farming back beyond the border.

IN THE HOLY LAND

BY T. D. W. FRIEDMANN AND M. ESKOLSKY

anything, even farming, was better than what he had been through the last year.

"Wait here," the official had said, as he gathered up the papers. "Someone will take you to the camp."

Soon Abraham, with his wife, Ruth, his two children, and their small heap of belongings were loaded aboard a bus. They drove out of Haifa and up the winding road, across the treeless Shaaron Valley, and into the new settlement of Beer Tuvya. There they were assigned a tent and that evening joined the line of new arrivals at the cook house. Here they were served soup, fish, macaroni and oranges on tin plates.

The next day Abraham was given a shovel and began work on the road to the new collective farm. That was five years ago. Today he has a small farm, half of which is irrigated, a three-room stucco house, a Jeep, four milk cows, a mule, some young cattle and 20 hives of bees. Ruth has 400 chickens.

Abraham rarely thinks of his life before he became a farmer in Israel. He has been too busy. That was another life in another world, a world of flight and persecution—his lot and the lot of almost all his present friends and neighbors before Israel was opened to them. Although he is aware of the undercurrent of international intrigue which has made Israel a bone of contention since the Zionist movement began fifty years ago, and although he has been the victim of the age-old feud between the Arab and the Jew, he is too busy, and too tired at night, to let these things

bother him. He has something he has never had before, freedom to be himself.

But the first month in Israel was not so pleasant. That first day, working on the new road—he had come in so tired he could not eat, and hid the blisters on his hands from his wife. But after a few weeks he felt better and even began to like the work. When the road was finished he took his family to the new collective, Kibbutz Ramat Jochnan.

He and Ruth worked sixteen hours a day that first year in the Kibbutz, getting started. Ruth was always tired. Back in Roumania, before the great trouble began, he had made a good salary, and Ruth had it easy, looking after the home and the two children. Now, when it came her turn, she looked after fifty children in the children's house at the collective. Then she was in the kitchen for a week, then in the laundry and the fields, often doing the work of a man.

Altogether though, Abraham reflected, he had learned much, and the family was alive and well. Who would have thought that one could live without money and not even miss it? Life was like that in a collective—you shared the essentials and since no one had luxuries, you didn't miss them. There was fine companionship.

Communal Life

Abraham soon fell into the routine of the collective. At 5:00 a. m. the guard sounded the big gong at the dining hall and a few minutes later he found himself at the table, surrounded by silent and moody early risers, sipping his tea. Then, one by one, all left for the fields and barns.

Abraham took his turn at all the jobs on the farm, learning a little of everything —milking, plowing with mules, planting, and finally, driving a tractor. He and Ruth had a room, a small room, meagerly furnished, a room like all other rooms in the common living quarters. The children lived in a dormitory with all the other children of the community.

Life centered around the dining hall. Here the men and women gathered in the evening to talk and sip tea. On weekends there would be a movie or a folk dance and sometimes a local talent play. When a major problem affecting the collective camp came up, the community gathered there to discuss it and vote on the decision.

The hour before the evening meal was sacred to Abraham and Ruth. This was the time the children came from their quarters to visit their parents. Then they drew apart from their neighbors; they found a secluded spot under a tree, and sat there in the cool twilight with their son and daughter, content just to be near them and hear their laughter and their questions. They looked forward to the time they could have them in their own home.

At the end of their first year in the collective Abraham and Ruth were rich in experiences only. Their worn clothing had been replaced, and they had had a

THE ARAB FARMER still uses camel power and a wooden plow as he did in the time of Christ. Jewish farmers are rapidly going to modern methods and machinery.

good living. But they had seen no money. The collective used the money which came in from crops for new machinery, a new building, or new animals. Like many of their neighbors in the collective, they looked forward to the day when they could get a farm of their own, when they could reap the fruits of their own efforts, and own property and animals. Abraham and Ruth saw the drawbacks in the collective system; often the good worker got no more than the loafer; and it was natural to want to own something of your own. They were not like those who preferred the life of a Kibbutznick with its freedom from responsibility and its security.

This opportunity came sooner than Abraham expected. He was visited by a friend from Roumania who told him that a new settlement over near the Trans-Jordanian border was being enlarged. Land was available on a long term lease for those who had the courage to face the dangers of the border, and the hardihood to pioneer a new and barren land.

"The new settlement is a Moshav, a cooperative," his friend told him. You will have your own land and own your own livestock and your own small tools," he said. "You will use the big machinery of the cooperative and will buy your supplies there and your crops will be sold by the co-op. What's more, you need not have any money to start with."

Abraham went to Tel Aviv and talked to the Jewish agency resettlement people. Two weeks later he was on his way.

Life in a Moshav

At the Moshav he was furnished with a tin prefab house of two rooms. The kitchen was furnished with a stove and there was a bed, a table and a few chairs. He signed a lease on 25 acres, agreeing to pay an annual rental of $10 for 49 years. From the Jewish Foundation Fund he got a cow, 50 hens, some farming tools, seeds for the first crop, and a few seedling fruit and shade trees. He agreed to pay a monthly rental of $10 on the house. At any time he could make a down payment of 30 per cent on its value of $4,000 and own it himself.

Abraham's first year in the moshav was a lean one. He planted a vegetable garden, a crop of cucumbers and melons, and built a leanto third room to the house for the children. The cow and the hens brought in a little money from the very first and he received a little cash money when the crops from the cooperative fields were sold. He dug irrigation ditches against the time the big pipe lines were completed to his property line, and he could get enough water for his entire farm. He established credit at the cooperative, which carries him when he is short of money.

"We all watched our black and white cow have her first calf," Ruth says. "A

(Continued on page 93)

LEFT: Poultry brings in cash when the new farmer needs it most. Here are ducks which never took a dive in a pool.

BELOW: American tractors turn up the soil deeper than it was ever turned. The land is rich, needs only water.

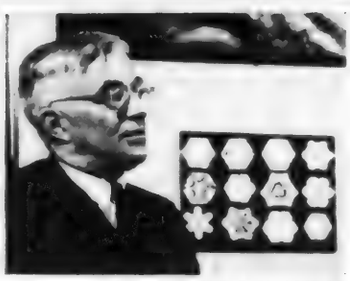
LEFT: The history of Israeli farming is the history of its search for water. Wells go deep, put down by modern rigs.

ABOVE: The co-op farmer plants a garden as soon as he moves into his prefab hut. A pipe line crosses this plot.

LEFT: Women often do the work of men. To them falls the work of gardening, the new farmer's first source of supply.

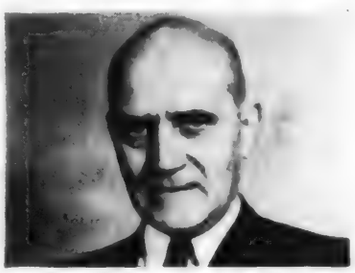
CAN WE MAKE IT RAIN?

Says Dr. Irving Langmuir of General Electric, "We have found it possible under some conditions, to modify weather and produce rainfall over wide areas. It is easier to produce rainfall in a general region 1500 miles away from silver iodide generators than it is at a 30-mile distance."



DR. IRVING LANGMUIR

Dr. F. W. Reichelderfer, Chief of the U. S. Weather Bureau, says "Using dry ice under certain special conditions it is probable that precipitation can be increased 5 to 10 percent in some parts of the country during the most favorable season. If it is used on a day to day basis on whatever clouds happen to be present, the probable increase is very much smaller. It is as yet too early to say whether substantial increases are possible using silver iodide."



DR. F. W. REICHELDERFER

RAINMAKING, formerly an occupation in which Hopi Indian medicine men held a monopoly, has grown into a full-fledged commercial operation. And to put it conservatively, rainmaking is a field with a great future. For if modern weather men can make it rain at will, we can change vast areas of the country from desert to green fields. We can step up crop yields so that there will be no problem in feeding our increasing population.

To the Western wheat grower who has seen his grain wither for lack of one good rain, it could mean the difference between going broke and having a good year if he were able to phone a weather consultant to come over and produce a good shower.

But the question is, as one Illinois farmer put it, "I have read about fellows making rain in Oregon; another one flies around and drops dry ice on clouds and fills up the water reservoirs for the city of New York, but do we know enough about rainmaking so that when I need some rain on my own farm, I can call up someone and hire him to produce a rain? I've seen periods in the last few years when a good rain would have been worth several thousand dollars."

The answer to that question, as of the summer of 1952, seems to be, "No, there isn't any reputable weather consultant that will take the job of making it rain for a single farmer." Of course there have been amateur flyers who were willing to go up and "seed a cloud" with dry ice just to see what would happen. They didn't know what kind of clouds responded to seeding and often nothing happened. There have been reliable accounts of amateur aerial water witches having started a shower. Whether the shower would have started anyhow is the question, and scientific proof which could have made possible an accurate appraisal of this kind of "spot seeding" just isn't available.

Rain on a Big Scale

Although the individual farmer can't get rainmaking service, there are about a dozen firms—Weather Consultants—they call them—that operate in the dry western states. They will contract with a group of farmers for increasing the rainfall in an area.

Says Robert W. Taylor, of Precipitation Engineers, one of these firms located in Great Falls, Montana: "We feel incapable of 'pinpointing' an increase of rainfall for a small area. Unless a ranch is at least 100,000 acres, it would not be practical to attempt to increase the rainfall. Our minimum charge is $10,000 for the work

necessary for experimenting toward increasing the rainfall in an area. In order to do the job right for an individual rancher we have to work on a large area, so we ask all the ranchers in the area to join cooperatively in the experiment. On a large area the charge is negligible — about ½ cent per acre, which is deductible on income tax as an operating expense.

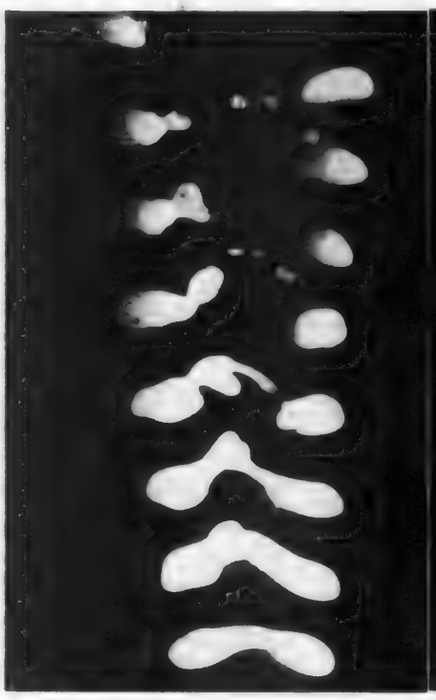
"In 1951 our operations started out in a limited way," says Taylor, "but rainfall for May, June and July in the area of Montana where we operated averaged well above normal, and above the surrounding territory according to our comparison with the Weather Bureau figures."

It Started in 1946

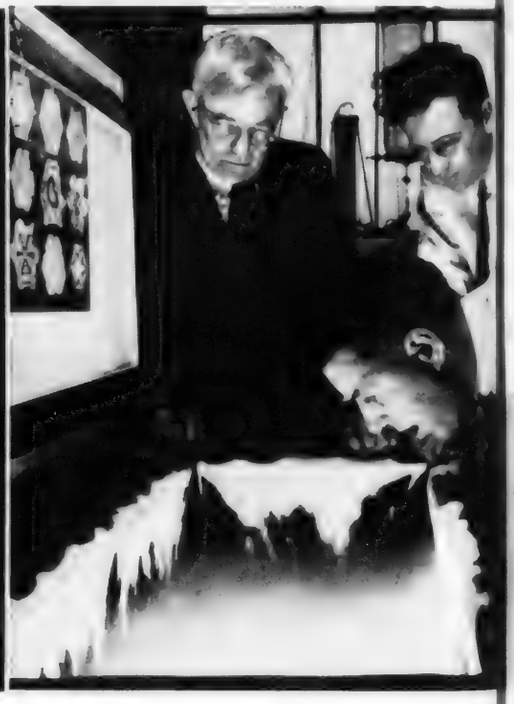
Rainfall control is still a young science; it started in 1946 when Dr. Vincent Schaefer flew over Mt. Greylock, Massachusetts, and started a snowstorm by dropping some dry ice on a four-mile-long supercooled cloud. The flight was made to give practical application to the experiments that he had made in the General Electric Laboratory at Schenectady, New York. Dr. Schaefer, a member of the GE research staff, had worked during World War II years to find the causes of aircraft static and methods to prevent it. Icing on aircraft wings and propellers was connected with static, and icing was one of the strange quirks of nature that has given scientists a partial picture of what the inside of a cloud is like.

For generations school books have told students that "rain is caused by a cloud condensing and falling to the ground as raindrops." But scientists say the explanation is not so simple. Unless something changes it, a cloud stays a cloud and the droplets of moisture stay too small to fall to the ground as rain. Today scientists admit that they don't know exactly what it is that goes on inside a cloud to cause rain or snow.

Working as an assistant to Dr. Irving Langmuir, GE's Nobel prize-winning scientist, Dr. Schaefer had been encouraged to widen our knowledge on the subject of weather facts. GE scientists knew that as a cloud of the cumulus type (the fluffy, summertime cloud) billowed higher, it entered the very cold upper air zone. Temperature decreases approximately two and a half degrees Fahrenheit with every 1,000 feet the cloud ascends in the air. Still, the water droplets which made up the cloud often remained unfrozen though the temperature dropped far below zero. This condition scientists call a "supercooled" cloud. And it is from this type of cloud that much of our rain and snow comes in the temperate zones. When an airplane flies through such a supercooled cloud, "rime ice" forms on it. A pilot gets out of such a cloud in a hurry for ice not only gives his plane an extra load to carry; but more important, it destroys the lifting ability of the plane by changing the flow pattern of the air over the wings.



IS A DROP of water shaped like a pear? These high-speed photographs of a drop falling show that it can look like a pancake, a French telephone or a turtle, but not like an artist's sketch of a drop. More important, the pictures show how the droplets combine as they fall.



THIS IS a man making a cloud. Dr. Vincent Schaefer blows into an ordinary deep freezer in General Electric's Research Laboratory to produce a cloud in the sub-zero temperature. Drs. Irving Langmuir, left, and Bernard Vonnegut watch the experiment that led to large-scale cloud seeding. By introducing a few particles of dry ice the cloud can be caused to change into a miniature snowstorm.

Making An Indoor Cloud

. What Dr. Vincent Schaefer had discovered in his laboratory that made possible snow-making over Mt. Greylock, was this. He had converted a four cubic foot home deep freezer into a "test tube"—a sample section of the cold upper air where the temperature was about 10° below zero Fahrenheit. He lined the freezer with black velvet and directed a beam of light into it. When he blew his breath into the cold air of the freezer, the moisture condensed and formed a miniature cloud. We have all seen this same thing happen when we come out of the house on a cold morning. We say it's so cold we can "see our breath."

Dr. Schaefer was able to create a "supercooled" cloud in his freezer, but no snowflakes formed. One day he wanted a somewhat lower temperature. To get the temperature down, he placed a piece of dry ice in the freezer. In an instant, the air was full of sparkling ice crystals, millions of them, which fell to the bottom as miniature snow.

This discovery guided the thinking of the GE scientists, and a series of experiments showed there was a critical temperature (38° below zero F.) at which a spontaneous reaction takes place, turning the super-cooled moisture into ice crystals to create a natural "nucleus." Scientists believe that nuclei, or starting particles of one kind or another, must be present before we can have snow. And snow seems to be the start of much of our precipitation. The tiny moisture droplets that make up a cloud will stay in a supercooled condition until snow particles or nuclei come along on which the droplets can condense to form snowflakes. A unique kind of nucleus was discovered by a Japanese scientist, who, according to record, succeeded in growing one snow crystal at a time by using rabbit hair as a base upon which growth might take place.

Apparently nature has a number of nuclei which set off a snowstorm. Dust and smoke particles, and salt particles near the ocean, serve as the triggering nuclei which cause the water droplets in the supercooled cloud to turn into ice crystals. And if the cloud goes high enough to cool to the 38° degrees below zero F. critical temperature, there is a spontaneous formation of ice crystals. Once nuclei are present or ice crystals start to form there is a chain reaction and the effect

A RACE TRACK IN THE SKY was formed when a stratus cloud was seeded with dry ice over New York state. This photograph taken from an Army plane flying at 20,000 feet shows the effect of the dry ice in causing the supercooled droplets to condense. The straightaways are 20 miles long. Observers on the ground reported seeing blue sky through two long slits in the clouds.

spreads rapidly through the whole cloud. In low-flying clouds, dust or large particles of sea salt could provide the nuclei for the start of a rainfall without the cloud going through a super-cooled state. We see the result as a crop-stimulating rainfall or snowfall.

Fooling the Clouds

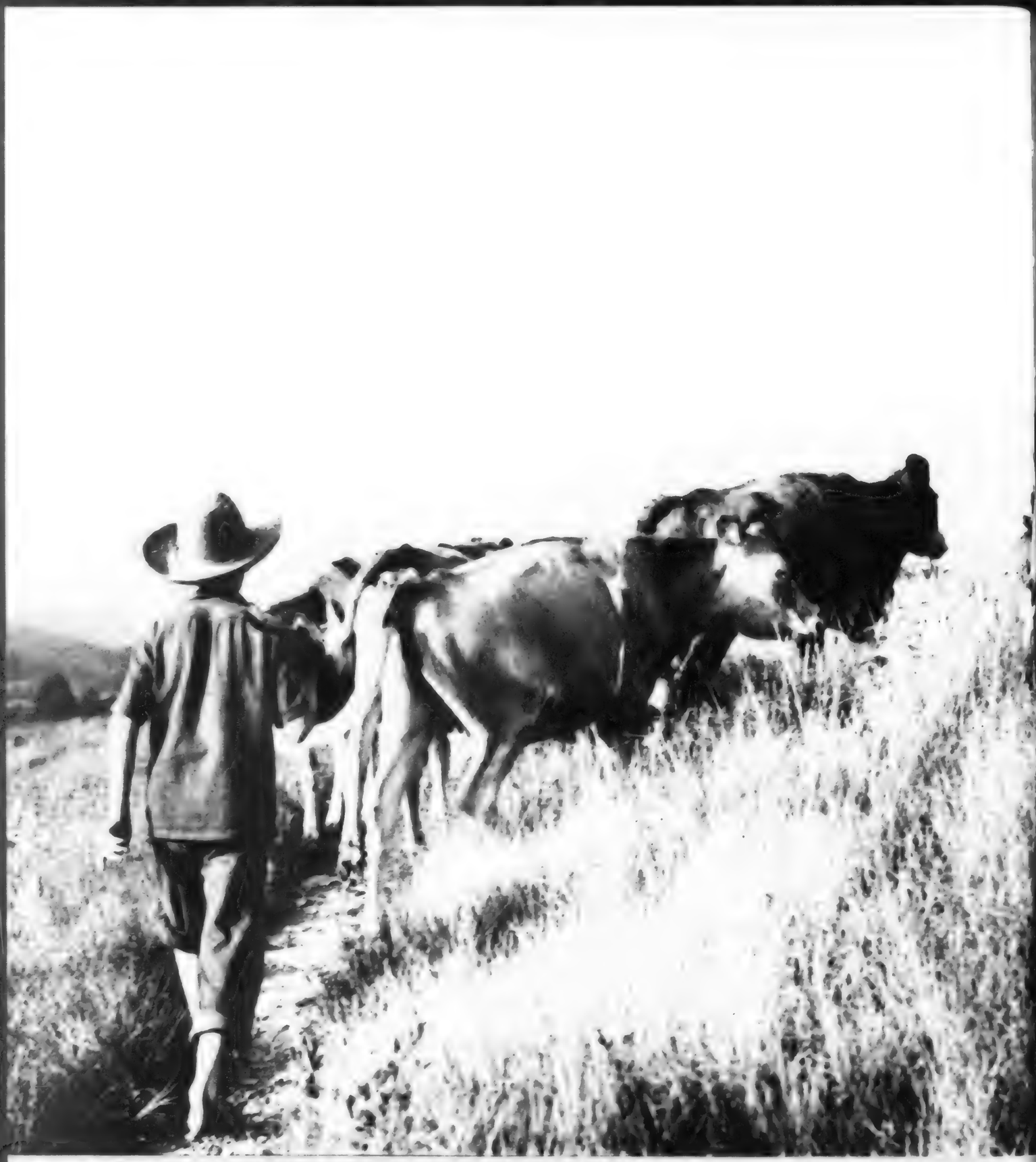
The next step was to work out a more practical method of producing man-made snow, than seeding with dry ice. This involved finding other artificial nuclei which could be released in the atmosphere. Of a dozen materials capable of serving as snow-making nuclei, Dr. Bernard Vonnegut, another GE scientist on the rain-making team, found that the best was silver iodide, a yellow powder containing silver. He fed silver iodide into the atmosphere by impregnating charcoal with silver iodide and burning it in a portable furnace about the size of a television set. This spread billions of nuclei into the arms of the wind every hour, each one capable of attracting moisture and becoming a potential raindrop.

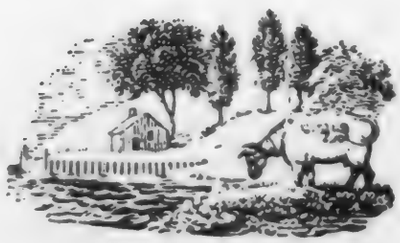
"The crystals of silver iodide are so much like ice," said Dr. Vonnegut, "that they fool the cloud into thinking they are ice."

Of the silver iodide smoke method of spreading nuclei into the air, Dr. Langmuir predicted: "If it becomes possible to use a great many generators on the ground to introduce silver iodide particles into huge masses of air, it might be possible to alter the nature of the general cloud formations over the northern part

(Continued on page 127)

DR. BERNARD VONNEGUT, weather scientist of the General Electric Research Laboratory, uses fire to dispense tiny silver iodide particles into the atmosphere. Burning charcoal impregnated with a silver iodide solution emits thousands of sparks, each of which produces millions of silver iodide particles. In the sky, the particles serve as nuclei upon which super-cooled or below-freezing water droplets in a cloud crystallize into snow. The snow then may turn to rain, depending upon temperature and humidity of atmosphere near the ground. At the right is a modern portable silver iodide "generator" used by North American Weather Consultants for their cloud seeding operations. It uses bottle gas for fuel and can be moved easily in a small truck.





BY JEAN BELL MOSLEY

Go Fetch the Cows

THE cow path did not come down from the hills as the crow flies. It meandered down the fragrant lane between the orchard and clover field, circled the maple grove and zig-zagged with the stake and rider fence. It was as though in some far away forgotten time, old, unhurried Jerseys had been allowed to pick their own path, and had in their leisurely, bovine way stopped here and there to nibble grass, their feet following their eyes from clump to clump, always seeking the greener and sweeter.

So it was that a little more time than was needed was spent bringing in the cows from the hill pasture; but this time was never counted as lost by anyone in the family, from the youngest, who raced barefoot in the summer dust, to the oldest, tottering on a cane, glad for the chance of solitude and meditation.

The cow path was a quiet lesson in peace and beauty. "Go fetch the cows," was a command Mother gave her quarreling children most any time during the day, be it eleven o'clock in the morning or two in the afternoon. Of course, we knew she didn't want the cows, but we were expected to walk up the path to the pasture, and returning, report on something we had seen along the way. It was a magic distance, for by the time we got back, the blue sky, the summer breeze, and the noisy quietude of insect hum and bird-song had absorbed our ill humor and restored our gayety. And as we grew older we found that these things renewed our faith in the permanence and reality of good things. It was difficult to nourish a grudge when you were hastening home with the news that the quail eggs were hatching, or to doubt that things moved along according to a Master Plan when the good green grass came to heal the hoof-scarred earth, or the sassafras bushes sprang up around the dead mother stump.

Every season had its special charm. In the winter there was the delicate featherstitching of the chickadees that bordered the snow-drifted path. Criss-crossing rabbit tracks led off into the glistening plum thicket and old black crows sat quarreling noisily in the dead sycamore.

In the summer the elderberry spilled its heady perfume on the gray ric-rac of the rail fence and birds flitted in and out the hedgerows like bright shuttles weaving a colorful pink and white pattern in wild rose and lazy daisy.

In autumn shocks of yellow grain stood like sentinels in the bordering stubble-field, guarding the newly disturbed homes of the Bob-whites and meadow mice and offering shifting patches of shade for the crickets and tired old summer grasshoppers. The droning of the bees was muted by their heavy honey bags and mud-daubers made haste to construct their labyrinthine homes.

Yes, there was peace along the cow path, peace and beauty and a quiet dignity that found its way to our hearts and has never yet let go. How wise my mother was to make us open our eyes and see!

DUCKS ready for market in nine weeks . . .

HIGH-SPEED has hit the duck business! And, incidentally, the famous Long Island duck is now being grown in numbers on the flat plains of the middle west, far from any body of water that even faintly resembles Long Island Sound. The Pekin duck has always had the reputation of growing as fast as Jack's beanstalk, and now, with new feed and handling methods, duck raisers can truck their ducks off to market in about two months instead of the twelve weeks that used to be the standard. If a pig could grow as fast (60 times his birth-weight in 63 days) he would be ready for market as a 200 pounder in 80 days.

There is no secret to this new kind of duck raising. Much of the pioneering has been done on the Research Farm of the Ralston Purina Company near St. Louis where their duck program is open for any farmer to see. They figure it takes 22 pounds of high-quality feed to produce a 6½ pound duck in nine weeks. If feed costs 5½c a pound, the total feed cost is going to be about $1.20 per duck. Ducks of the quality that can be raised by this method will sell for an average wholesale price of 28c a pound. So a duck raiser has about 50 to 75c profit over feed cost in each duck. If his labor is efficient, he can come out with as much or more profit as with broilers. The commercial raisers of broilers consider ten cents net profit per bird a good figure on a large scale operation.

About Buildings

Because ducks grow so fast, the housing space that was adequate to start them off will squeeze them so tight in a couple of weeks that they won't even be able to quack comfortably. The table below gives the right amount of floor, feeder and water space during the entire nine weeks.

Age of Ducklings	*Requirements per Duckling*		
	Floor Space	*Feeder Space*	*Water Space*
1 Day to 2 Wks.	½ Sq. Ft.	½ Inch	½ Inch
2 Wks. to 4 Wks.	1 Sq. Ft.	1 Inch	1 Inch
4 Wks. to 7 Wks.	2 Sq. Ft.	2 Inches	2 Inches
7 Wks. to Market	3 Sq. Ft.	2 Inches	2 Inches

The ideal house plan for ducks is a three house set-up. Then the temperature, space and feeding can be fitted to the size of the ducks. These three houses can be called:

1. Warm Brooder House.
   Used from day old to two weeks.
   Hover temperature 90°F. the first week: 80° the second week.
2. Cool Brooder House.
   Used from two weeks to four weeks.
   Hover temperature 70° third week; 60° fourth week.
3. Cool Growing House.
   Used from four weeks to market.
   Reduce temperature 10° per week to 40°.

At the first look the housing needed for ducks seems more expensive than for broilers, which require only one square foot of space per bird. However, the difference in the amount of heat needed saves money and the houses need not be insulated, a further saving. Ducks need lots of fresh air and additional space can be provided with yards. They can be allowed outside after they are three weeks old in all but the worst winter weather. Ducks feather out faster in cool temperatures, eat better and have more vitality, all of which results in smooth, plump flesh.

The duck experts point out that ducks which are kept away from ponds and streams have whiter meat and grow faster because they burn up less energy in exercise. If the duck yard has a six inch layer of 1½ inch gravel laid on top of gently sloping land the yard is kept self-cleaning by the rains. The fence around the duck yard is cheap and easy to build as it need be only 24 inches high.

Ducks That Lay Like Chickens

Duck raisers pay from 20 to 25 cents each for their day old ducklings. The newcomer who wants to get into the duck business should check the hatchery he intends to buy ducks from; several people who have bought ducklings from the hatchery being considered should be contacted to see if the ducks are healthy and vigorous. Most big commercial operators prefer to hatch their own and costs per duckling are often reduced to 15 cents for a day old duck.

The duck raiser who wants to produce his own eggs and hatch them has the stage set by the feeding program worked out

TWO-WEEK OLD ducks enjoy getting outside on a rainy spring day. Ducks are hardy and cool weather helps develop a good crop of feathers. The 1½ inch gravel in the yard is self-cleaning with each rain and keeps down sickness.

THESE DUCKLINGS are an hour old, and ready to start eating and growing. They are banded so their gains can be checked.

for breeder flocks by Purina. The average Pekin duck allowed to roam about the farm will produce 30 to 40 eggs a year, usually in February, March and April. Now a commercial grower can get 250 to 275 eggs a year, on a year around basis. And that keeps a hatch coming out of the incubator every 28 days throughout the year.

How They Eat

There is a difference between duck feeds and chicken feeds. Because of the duck's rapid growth he requires a high energy, high protein feed, with a perfect balance between the various ingredients. Liver meal has been found to be one of the ingredients that prevents bowed legs. Manganese and an antibiotic are also important in the duck's ration. The feed requirements of ducks during the different growing periods are as follows:

Day old-2 weeks, 1/8" pellets,	1.5 lbs.
2 weeks-7 weeks, 3/16" pellets,	13.5 lbs.
7 weeks-9 weeks, 3/16" pellets,	7.0 lbs.
Total	22.0 lbs.

The feed should be before the ducks at all times in self-feeders. Ducks should have plenty of fresh water supplied in a trough with a baffle to keep them from getting their feet in it. They will also eat small amounts of sand and grit.

Ducks are healthy fowl and given reasonable care the raiser can market 95 to 98% of all that are put down. Keel Disease is the duck's worst enemy, and it kills them during the first three weeks. A disease known as "New Duck Disease" causes the birds to act sleepy and droopy. Cholera, characterized by a lack of appetite and a painful waddle may be soon

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AT EIGHT WEEKS this duck weighs 5½ pounds. It will go to market in another week. Handling a duck by its neck avoids breaking its legs, which are quite brittle.

The next potato glut may be a blessing,
for stock feeders have found them
good feed, equal to corn silage.

SPUDS MAKE GOOD STOCK FEED

LEFT: John Knopp, Toppenish, Wash., feeds out 250 cattle a year on cull potatoes from packing plants. He pays about $6.00 a ton for them, says they are good feed. He feeds silage with the potatoes throughout the year, finishing his cattle on ten bushels each of corn. RIGHT: The Dutch farmer steams his potatoes for his hogs. Buried, they will keep for two years.

It was only about two years ago that the great potato scandal was the talk of the country. Even today, potatoes are still the classic example, of a price support program gone wrong.

The way farmers and extension workers in the potato growing regions are finding new outlets for spuds as stock feed, though, it appears unlikely that future surpluses of the crop will ever again be a problem.

The standard works on feeding and animal nutrition have little or nothing to say about potatoes as a stock feed, but men who know potatoes best will tell you they are a mighty appetizing dish for stock and they build meat and milk with real efficiency. European farmers have been fattening stock on potatoes for well over a hundred years. Here in the U. S. A. we are just beginning to learn how good they are.

The Red River Valley of Minnesota and North Dakota, for instance, grows a lot of potatoes; and there is a sizeable livestock population in the area, too, plus a contingent of progressive farmers who are determined to make something of this juxtaposition of spuds and stock. With the help of their experiment stations they have made some real strides in the last few years.

Homer Fausch and his co-worker, O. M. Kiser, at the Northwest Station of the University of Minnesota at Crookston, have completed four years of potato feeding experiments with cattle. The results indicate that the practice is here to stay.

While the potato experiments were prompted by an effort to find a way of disposing of culls, Fausch now says, "Our steers have paid as high as 7c per pound for cull potatoes figured on the basis of the ability of the potato to replace other more expensive parts of the ration. That's about what you pay for potatoes right now in the grocery store."

Now this isn't to suggest that American farmers start raising potatoes for cattle feed as is common in parts of Europe. There's just too much labor involved in the crop to make such an operation profitable at our wage rates. But in ordinary years there are always going to be piles of culls and these now appear capable of being fed to advantage. The question is how to do it.

Fausch warns that "a fellow should start out with a few steers the first year or two while he is learning the tricks." Those tricks don't appear to be too difficult to master.

The major problem is storage. One possibility here is to put the potatoes in a straw shed adjacent to the feeding area. This type of storage was found to protect the potatoes against freezing even at 20 below zero temperatures. This is important because frozen potatoes are no good for feed, although there is another type of storage practiced in this territory known as freeze-drying. In freeze-drying, the potatoes are spread on pastures or feed lots during the coldest part of the winter to a depth of not more than four inches. They are then allowed to freeze solid, to thaw and to freeze again, so that the water is lost while the starch grains are trapped inside the shriveled up tuber. Tests show that about 90% of the starch is retained in these mummified potatoes and they make a good and palatable feed.

Silage is another storage method that has been tried with a good deal of success. Hay or straw, preferably the latter, must be added to the potatoes at the ratio of 1 to 4 by weight (one pound of straw to four pounds of potatoes). The Minnesota people have found that the best way to make the silage is by building up alternate layers of oats straw and whole potatoes in a silo made of snow fence two or three tiers high. Silage made in this manner produced steer gains of 2.76 pounds per day for 70 days as compared with 2.06 pounds per day for grass silage, when fed with grain and linseed meal.

Fausch warns that trying to put the potatoes and straw through a cutter and blowing them into the silo just won't work. The potatoes come out with the consistency of country chicken gravy and simply can't be blown any higher than about four feet.

Dehydrated alfalfa stem meal fed with potato silage has been tried with success by Ole Flaat, one of the pioneers in potato feeding at Grand Forks, North Dakota. Dehydrating made the silage easier to handle and reduced the laxative effect produced by regular legume-potato silage. There is also the possibility that with a little more experimentation this dehydrated product might become a good, low cost commercial feed.

As to the kind of steers that do best on potatoes, the Minnesota experiments show that they can be fed to the best cattle at a profit as well as to poor cattle. Conservatively speaking, though, Fausch explains that "for all around feeding advantages we like medium grade feeders best. They give us good gains and usually we can plan to grade them up a grade or two by the time they are finished. They are cheaper to buy than choice or good feeders and if you select your cattle carefully they will do just as well or better in the feed lot."

Otto Schroeder, a pure bred Hereford raiser at East Grand Forks, Minnesota, feeds large quantities of fresh potatoes to his registered cattle, while the Moe Brothers of the same vicinity have consistently done well with poor cattle.

The ration, of course, is one of the most important factors of the whole potato feeding program. Generalizing, Fausch

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HIGH PRODUCING cows and dairy know-how have made this hilly New Hampshire farm a profitable operation.

Building a High Production Dairy Herd

DAIRY CATTLE were among the first settlers in America. In fact, they were here ahead of the Pilgrims, for Columbus records that he brought cattle to this continent on his second voyage in 1495.

Since that time, a lot of milk has been poured out of milk pails, but not as much as should have been. It costs right at $250 for feed, housing and incidentals to keep a dairy cow for a year. If she produces 6250 lbs. of milk and 250 lbs. of butterfat she will bring in about $250 in milk checks. If a dairyman wants to be paid for his own time it will have to come from increased production of the cow, over and above this break-even figure. In 1951 our national average for dairy cattle was 5,200 pounds of milk and 211 pounds of butterfat, which gives a rough idea of just how far a lot of farmers with dairy cattle still have to go. A farm on which the main activity is dairying couldn't make a go of it with such a record. But no matter what his herd average was last year, there isn't a dairyman in the country who doesn't want to raise it next year.

The best way of building a high production dairy herd can be pegged on these three hooks: Breeding, Feeding and Intelligent Handling.

Suppose we start at the beginning. If a young man is going to build a dairy herd today, he discovers before he goes very far that good cows are expensive, and high-producing cows are out of this world. For example, at a recent sale near Kenton, Ohio, Brown Swiss cattle with production records brought an average of $900 apiece

on the first 20 animals sold. So, unless he has a rich uncle, a man who starts out to put a herd together today may have to limit himself to three or four milkers and look for calves from cows with high-production records which he can buy reasonably. Some dairymen are selling heifer calves at four days old, after their own herd replacements are taken care of, and these calves often can be bought from $25.00 up. With milk at $5.00 or better a hundred pounds, a dairyman doesn't want to raise too many calves. Taking very young calves to raise is a type of installment buying, for a man by his own labor and his own feed is able to bring good cows into his milking herd in a couple of years.

Where to Buy Heifers

The man who buys calves this way must spend time hunting for them. You can start out by getting the names of good herds from testers, breed associations, or dairies. The advantage of this method of herd building is that a dairyman trades his time for money, with the chance that he can put top-quality animals into his herd. The disadvantages are that he has all the hazards of raising the calves and he has no milk checks from them for a couple of years.

If you want to step up to a little older calf, say a two or three months old heifer, it is possible to pick them up at herd sales for under $100. For about $200 more in labor and feed you can put this heifer in your herd as a milker.

The cheapest way to build a herd of dairy cattle is to go to good dairy farms and buy yearling heifers. To do this a man has to be a good judge of heifers, or have a friend with him who knows how to judge the milk possibilities of year old heifers. They are gangly looking and only a heifer's mother could love them at this age. Often, they can be bought at just about meat prices. That means a heifer would cost between $125 to $200, depending on the weight of the breed. At this size, the heifer is half-way to milking age and the hazards as well as time and feed required to raise her to milking age have been cut in half.

If a dairyman has the money to go out and buy milking cows it can be done, but it is an expensive proposition. To get good milkers a man will have to spend between $300 and $500, and more if the cow is a good producer with a record. But if a farmer is a good judge of cattle he won't always buy the highest priced cow to get the best milk producer. He may be satisfied with a less perfect type animal, or one with a less fancy pedigree.

E. D. Humphrey, one of the leading dairymen in the Cleveland milkshed, whose farm is in Ashtabula County, had a young dairyman come to him from Pennsylvania to buy some cattle. Humphrey said, "You don't want to buy the cows I have to sell, for I'll sell you the animals off the bottom of my herd." The young man studied the herd and the production records and decided to take a chance. A short time later he was back to buy more cows because the bottom of Humphrey's herd was better than the best he had at home. Humphrey's dairy "know-how" was given recognition in Ohio in March, 1952, when he was named the number one man in Ohio Dairy Herd Improvement Production Efficiency awards.

If the new dairyman doesn't know cattle he had better cultivate the friendship of a good and successful dairyman and ask him to help in selecting the right cows. This dairyman may not have animals to sell himself, but he will usually be willing to help a young man get started. Chances are that's how he got his start.

"My Cows Don't Pay"

Suppose we take a look at the problem of the man who has a half dozen milking cows who is just barely breaking even in his dairy operation. He's been through all the work that goes with dairying for three or four years. He can see from his income tax report that he is getting nowhere, for he doesn't have any tax to pay. He says, "I have to build this herd up so they produce more milk and butterfat, or I'm going to sell every cow on the place."

There may be several weak spots in his dairy program that can be overhauled. The first point to check is the bull he is using. Usually, a man who has only a few cows cannot afford to buy a good enough sire to lift his herd average, and this holds his whole herd down. With the outstanding sires that are available in the artificial breeding rings at a low cost (some of the big associations in the Midwest charge as little as $6.00 for a service), this man would find artificial insemination to be a good way to bring the best milk producing bloodlines into his herd. If a dairyman uses artificial insemination and sticks to the best sires available in an outcrossing breeding program, that is, mating animals of different families within the same breed, he will often find he can raise his production average as much as 100% in a generation or so.

Another idea on breeding for the man who has a commercial herd of grade cattle is that given by Dr. M. H. Fohrman of the USDA Bureau of Dairy Industry at Beltsville. He has made the statement that when the inseminator drove into his barnyard he would ask him to breed his cow to the bull that had the highest milk record whose semen he had with him that day, regardless of hair color or breed. Dr. Fohrman feels that grading, that is, breeding a grade cow to a high-production purebred sire is the way for the commercial dairyman to fill the milk cans and to bring in the big milk checks.

The man who wants to use line breed-

DICK BROOKS, who farms with his father near Marion, Ohio, has a good reason for wearing a grin. He just weighed out the milk from Sunnyfield Marion, in back of him. It spun the scale to a few tenths over 100 pounds. Last year she did slightly over 25,000 pounds, which is something to talk about in anybody's milking parlor.

ing, that is, breeding a cow to a bull to which she is 25% to 50% related, has not much choice of doing it on an artificial breeding program. Line breeding concentrates the good traits of the animals bred, in the new calf. It can also concentrate the weak points. It has been used successfully to fix high milk production in a herd. The sires are usually of a ripe old age when they arrive at the insemination farm. They are, however, good proved sires, so this helps offset the disadvantage of not being able to use line breeding.

A proved sire is a bull who has daughters with milk and butterfat records which can be compared with their dams' records. This comparison may prove the bull to be a good transmitter of milk, butterfat and other desirable qualities. Or it may prove the bull to be a poor transmitter of these qualities. *The words "proved sire" are no guarantee of quality.* Be sure that the bull's daughters' records show him to be the herd builder-upper.

Good Feeding

Feeding varies with each farm, because dairymen grow different feeds and use them differently when they are mixed into the dairy ration. If a dairyman wants to get the most out of high-producing cows, he will want to have, first of all, good pasture available, for good pasture is cheap feed for several months of the year. Two acres per milking cow is a good average. He will want to feed roughages abundantly. Three pounds of hay per 100 pounds of body weight is an average amount. If the cow is getting ensilage, she should be given about three pounds a day based on each 100 pounds of live weight. This should be divided between morning and evening feedings. When a cow is fed ensilage her hay ration can be cut down to one to two pounds per 100 pounds of weight. A good rule of thumb on concentrates containing 16% total protein is to feed one pound of concentrate for each three pounds of milk produced above 20 pounds per day in the smaller dairy breeds: above 30 pounds in the larger breeds. This is fed in addition to the hay and ensilage she gets. Salt and minerals are fed free choice by most dairymen in addition to the amounts that are contained in the concentrates or mixed feeds.

A Home-made Mineral Mixture

A mixture of 100 pounds of steamed bone meal, 100 pounds of ground limestone and 100 pounds of iodized salt makes a palatable and low-cost mineral mixture which will take care of a cow's mineral requirements. In the summer it can be fed in a box in pasture and in the winter in the loafing barn or barnyard.

Clean water should be supplied, as much as the cow wants. Cows producing 100 pounds of milk a day may require up to 300 pounds of water daily. A good water ration to work with is 12 to 15 gallons of water per animal per day.

Complete dairy feeding plans have been worked out on the research farms of the leading feed manufacturers, and these plans can be adapted to a farm where home grown feeds are used, or the plan can be used to provide the total grain ration. In the East where little home grown grain is used, these rations have been used to produce top milk records. A good feeding program helps level out the milk flow throughout the entire year. There isn't the peak production period with a violent drop-off later.

The Eye of the Master Produces the Milk

Intelligent handling takes in a lot of territory. It includes knowing when to breed for an all-year flow of milk. Many dairymen now like to have their best cows freshen in the fall; this assures a good volume of milk in the winter and gives these cows a boost in their milk production in the spring when they go on pasture. Intelligent handling includes a sanitation plan that keeps the cows comfortable and clean.

With stanchion-kept cows, it is important to have fresh and clean bedding laid down, morning and night. If the cattle are handled in a loafing barn there is no excuse for letting the manure build up to the cows' knees. The straw has to be spread as often as is necessary to keep the bedding clean. Obviously, it will have to be spread more often if you are handling a large herd of cows. Lime is cheap and the easiest way to put it on your fields is in manure. When lime is spread over a loafing room floor it not only kills the odor, but reduces dampness. Spraying with a power sprayer using disinfectants and long-lasting fly sprays are part of the spring housecleaning program in most dairy barns. During the summer the fly-killing spray should be repeated whenever the flies start increasing. In the winter, when animals are closely confined, dampness and foul air have been contributing factors to cow diseases and the new automatic electric barn fans are a good investment when a large number of animals are kept in a barn. They provide a draft-free change of air and move the air out whenever the temperature rises above a pre-set level.

AN EXPECTANT HEIFER can look forward to a long and happy life in a dairy if she can produce 350 pounds of butterfat for her first year's production record.

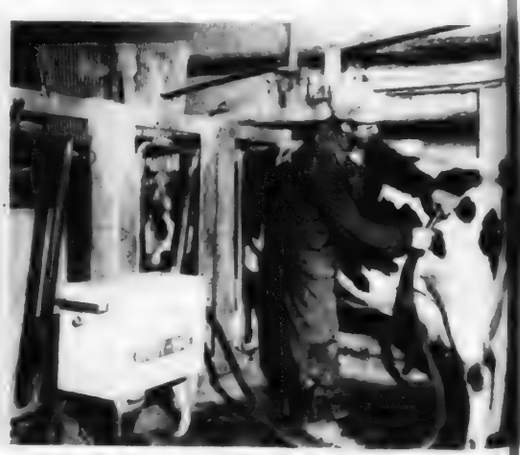
Building Up a Purebred Herd

The best way to see how the three points—breeding, feeding and intelligent handling—work out, is to look in on a dairy farm that has used them.

H. J. Brooks and his son Dick got in the dairy business in 1943. They had been raising beef cattle, but they liked dairy animals better because they thought they would fit better into their farm program. The 400-acre farm near Bucyrus, Ohio,

LEFT: DICK BROOKS and his father are in the barn for every feeding. He says, "We haven't found any better feed than our own alfalfa-brome-ladino hay; all we raise on 93 acres stays on our own farm."

RIGHT: DICK GEORGE likes to give his cows a vacuum cleaning once every day, but he doesn't always make it. "It's cut the sediment in our milk down to a point where it isn't any problem," he says.



is flat and needs tile for drainage—last year they laid 13,000 tile. They think one of their biggest assets is the ability of the land to raise fine hay.

In 1951 they had 93 acres of brome, alfalfa, ladino mixture which was baled at just the right time. During the winter the baled hay was green and alfalfa blossoms still showed a purple color. "There just isn't any better feed for a dairy cow," says Dick Brooks.

The Brooks' Holsteins are sleek and their coats show the effect of the green hay and grass silage they have been given during the winter months.

H. J. Brooks, the father, is a man in his sixties. His easy way of handling his cows make you realize he knows the personalities of each one of them. Recalling how he and his son got into dairy cattle, he says, "When we started our herd, we bought a few good grade cows from dairymen whose milk records we felt were accurate. Then, we went to a state sale and bought a couple of registered heifers. One —Old Catherine—turned out to be quite a foundation cow. We have three daughters and a granddaughter out of her in production now. They have good size and lots of capacity. Old Catherine sold as a medium priced cow mainly because she wasn't too flashy looking, or an outstanding show type.

"We bought a few cows during the years, but mostly we built up our present herd of 75 with our own stock and from the original 10 cows that we started out with in 1943. In the last five years we have culled out about 10 cows each year. Our culling method is to sell any heifer that doesn't make 375 pounds of butterfat in 305 days on her first freshening. The results of this severe culling have paid off, for in 1951 we had several heifers which made over 500 pounds of butterfat on their first freshening."

Dick Brooks, the son on the farm, is a firm believer in watching his cows eat. He says, "There isn't anything I have to do around the farm that's more important than feeding our milkers and seeing how they eat what we give them. Since we put in our new silo a couple of years ago, we

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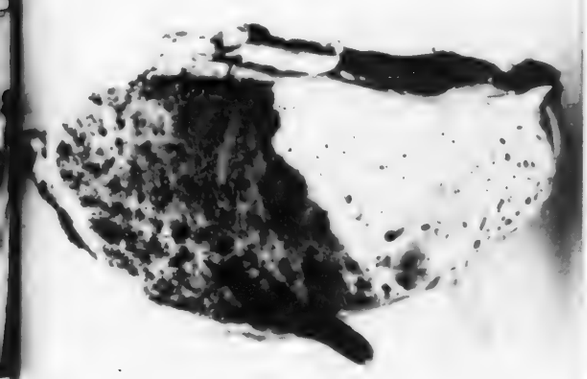
MARK LOCKWOOD, the insemination technician, made it over to Dick George's farm near Lancaster, Ohio the same afternoon on which he was called. His first question, "Is she goin' to be rough?"



THE LEFT HALF of a cow's udder cut to show what goes on inside. The rear quarter has been stained. Notice how there is a definite separation between the quarters. The holes are the milk ducts which drain the alveoli, the cells where the milk is produced. No mastitus scars are present.

FEELING FOR TURTLES

BY CHARLES C. WEBB

ALTHO this method of catching the hard shelled snapping turtle may not appeal to most folks, others will not hunt them any other way. The snapping turtle is nocturnal in its habits, they are voracious, they will eat most anything that comes their way; it is said that snappers never feed except under water. It is strictly carnivorous. Many young ducks and mushrats fall prey to the sharp jaws of the snapper.

When daylight comes the turtle will retreat to some dark place such as the bank holes of mushrats, overhanging banks under tree roots, along the banks under drift wood piles, old submerged logs; they frequent sluggish water ways, ponds and lakes more so than they do swift rocky streams. The best time to feel for turtles is on nice warm days from daylight to noon, as the turtle will most likely be headed in during the first part of the day; they then turn and will be headed out; then they are most likely to bite the feeler's hand.

Feeling for turtles should never be undertaken in an area where the cotton mouth moccasin is found as they frequent the same places as do the turtles. The harmless water snake is very frequently found when feeling under the banks of creeks. They will sometimes give you a very nasty bite but are in no way dangerous. It is always wise to identify any snake that should by any chance bite you. I never worry about them as I am also a snake collector and come by some nice specimens while feeling for turtles.

My experience with turtles is that they will bite under water the same as they will above water. I have never been bitten badly altho I know feelers who have been terribly bitten; a large snapper can and will take a finger off with his sharp mandibills. One should always take a buddy with him so he will have some one to help him if he should get into trouble; a first aid kit and a good sharp knife should always be carried with the turtle feeler. I always keep my hand closed into a fist; in this way it is difficult for the turtle to get a hold on the fingers. Many times I have had them bite my hand when they strike.

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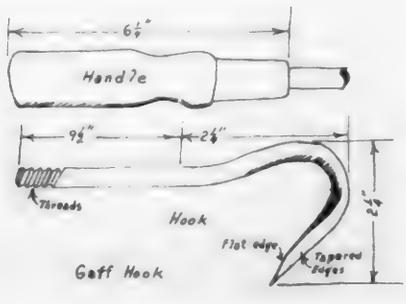

Mr. Webb's own design for a turtle gaff hook. Made from 5/16 in. drill rod it is 18 in. long and will easily cut through the thickest shell.

want a buffaloburger?

Some farmers can't stand prosperity; some get bored with their routine chores, crops and livestock. If they are unhappy they can always make a change, since this is a free country. They can go into the restaurant business, grow orchids,—or they can raise buffaloes. That is what farmers like Ed Butters up in Michigan, Gene Clark in Independence, Kansas, and Jake Kohberger, of Lock Haven, Pennsylvania, did—when things got dull they bought themselves some buffalo.

Take Jake Kohberger. Jake got the buffalo bug about a half dozen years ago. At one time or another he has been a farmer, tavern keeper, garageman, butcher, grocer, real estate broker, coal dealer, club manager, cattleman, hog raiser, seed grower, operator of a riding stable, and trucker.

But Jake's weakness is animals. Out behind the barn on his place near Lock Haven he has a small building you might take at first glance for a concrete milk house. Connected with it is a heavily fenced run. Inside is a bear, a live bear.

"A few years ago I loaned a guy $100 and he left the bear with me for security," Jake explains. "I fed the critter for a good many months. Then one day he came back and wanted to pay me the $100. I told him he'd have to pay the feed bill, too, and he said 'Keep the damn bear.'"

Jake also has a dog, a cat, twenty-three head of buffalo, a bunch of cattle, several score of hogs, a string of riding horses and a Scotch Highland bull. No one who knows Jake would be surprised to find a giraffe in his haymow.

GENE CLARK, Independence, Kan. (left), has one of the largest private herds in the country. He has rigged up his own gadget for holding them when vaccinating or treating. Ed Ott (right) manages a 17-head herd on the Ralph Stolle farm near Lebanon, Ohio. These ranged outside all winter and put on weight on corn fodder.

IN THE WILD STATE the buffalo was a nomad, ranging over hundreds of miles. Disease and parasites were rare. Wolves killed off the weak and unfit. Confined to a few acres per head in captivity, his disposition may suffer.

But Jake's buffaloes are his favorite animals. And, incidentally, for the satisfaction of the zoologists, the buffalo is not a buffalo at all, but a bison. *Bison bison;* but buffalo he has always been since the time of Buffalo Bill, and buffalo he will remain.

Jake's buffaloes range on his 250 acre farm which straddles Highway 220 between Lock Haven and Williamsport. A good portion is bottom land along the beautiful west branch of the Susquehanna River. There are some hilly fields, too. This was native buffalo range a hundred and fifty years ago. Kohberger's place is only a mile or so east of Great Island, a spot where the buffalo used to cross the river in herds of hundreds of thousands on their annual migrations.

On this river farm Jake operated a dairy for some twenty years. He had his own pasteurizing plant and delivery trucks, the while he operated a grocery, a meat market and a coal yard in Williamsport, and his club on the south bank of the river. Then six or seven years ago Jake had a tilt with the OPA over meat prices, and came off second best. He sold his stores, his coal yard and his cows and retired from the field to lick his wounds. It was then that he found himself with a lot of idle pasture. One of Jake's numerous sidelines gave him an idea about his idle grass.

At the club he had put on a big annual feed for the boys. The main dish was usually some kind of rare or exotic meat such as venison, bear or buffalo. Jake recalled that he had paid prices for this meat as fancy as the stuff itself. He decided to try raising buffaloes. "Besides," he said to himself, "here's a business that damn OPA can't touch."

From a friend in Denver he heard that the city had some buffaloes for sale. He mounted his truck, drove to Denver, and brought back six bred cows. This was the fall "right after OPA."

The cows cost him about $150 at Denver. The transportation he charged

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There are tricks to buying farm insurance against wind, water, fire and liability. A policy holder should know how to protect himself.

THE BIG PRINT GIVES

...THE LITTLE PRINT TAKES AWAY

BY H. L. TINLEY

IF YOU don't check your livestock policy before you have a loss, the adjuster will check it for you afterwards; and that's a bad time to learn that your best cow, just struck by lightning, had only the last eighteen inches of her tail insured.

Nate Strouse, who farms 200 acres of good Iowa land, can tell you how true that is. He had a taste of push button warfare when lightning struck his barn —instead of damaging the barn, it killed four cows a quarter of a mile away. Apparently the lightning rod cable had rusted off at the ground and was over the wire fence which was nailed to a corner of the barn. The charge travelled down the cable, through the fence, and jumped to the cows. Result, four dead cows. Steel posts will ground a fence, but as bad luck would have it, Nate was using wood posts.

Nate's dairy herd had been built up largely on borrowed money and losing four cows hurt him. The loss, though, did give him a chance to submit his first livestock insurance claim. After turning in the claim, he didn't have long to wait for an adjuster. Insurance companies move out fast on livestock losses. It was easy to prove that the animals were killed by lightning, and neighbors attested to the date and hour of the storm. The adjuster, though, took an extremely dim view of the fact that Nate was running forty head of cattle worth $300 a head, while he only had five head insured in his policy, and these for only $100 each.

"There is no doubt about the claim, Mr. Strouse," the adjuster said gloomily, as he pushed back his hat. "The trouble is with the small amount of insurance you are carrying, only $500 insurance on a $12,000 herd. When you spread such a small amount of insurance over a large herd you don't have much insurance on each animal. With your policy you have only $12.50 insurance on each head. Personally, I'm sorry, but we can pay you only $12.50 for each animal killed. That's $50.00."

Is that shabby treatment? May be—whether it is or not, you can imagine what a shock it was to Nate Strouse. He lost $1200 worth of livestock and collected only $50 from his insurance company.

There are two sides to any story, and there's another side to this one. Let's turn the picture around and see how the insurance company arrived at this almost negligible settlement. If they had paid Strouse $500 — the full amount of his policy, your livestock policy and mine would be so expensive we couldn't afford it. If it were always true that out of a big herd the cattle killed by lightning or fire were the ones insured, the insurance companies would soon run out of dollars. Most companies won't complain unduly if a farmer doesn't have his herd insured up to its full value. However, they are a little hard to keep in the buggy when the policy doesn't reasonably reflect the size and value of the herd.

Check List for Building Insurance

You don't have to have thick glasses, a slide rule and a college degree to check a farm policy—all you need to know is *what* to look for. They say the big print in a policy gives you protection, the fine print takes it away, but it's not quite that bad—the fine print can be understood. Fifteen minutes spent checking your policy against the nine points listed below will eliminate most of the misunderstanding. Many insurance agents operate on the theory, "If you can't convince 'em, confuse 'em." These check points will help eliminate the confusion.

1. *EXPIRATION DATE:* You can't collect on an expired policy any more than you can drive a tractor on the gas you used yesterday. See that your policy is still in force. You'll find the expiration date on the front of your policy, probably on the inside too. Usually it's both places.

2. *FIRE, WIND AND HAIL:* This is the basic coverage needed on your buildings. If your policy says "fire and extended coverage," you have a package policy that is possibly giving you more protection than you actually need. It's hard to reason sometimes why protection

WIND INSURANCE will protect against either a zephyr or a hurricane, but your policy will give you only the depreciated value of your shingles and siding, plus labor.

is needed on a barn or other outbuilding against aircraft falling, vehicle damage, riot, strike and explosion, which are some of the items under "extended coverage." If a plane or car would damage your building, you could collect from the insurance company covering the vehicle or plane, if they had insurance. The basic protection you need is against loss by fire, wind and hail. The extended coverage endorsement which supplies the fringe benefits is not too expensive, and many farmers enjoy the comfortable feeling of being fully covered, especially on the dwelling. There's always the possibility of a heating plant exploding.

Fire insurance includes protection against damage by lightning. To qualify as a wind claim a building need not be damaged directly by wind, such as blowing off shingles, damage to roof, etc. If a tree is blown down and falls on an insured building the damage to the building is collectible under a wind policy. Actually, some of the biggest claims have originated from old buildings coming apart in a strong wind and blowing against an insured building. Insurance companies don't distinguish between *kinds* of wind; if damage is traceable to wind it's enough whether the wind was a zepher, tornado, cyclone or hurricane. Some insurance companies exclude glass breakage in a storm door or window, though the majority of your companies will honor such claims. There are few limitations in the wind provision in the policy, though there are some. If wind blows off shingles or siding and rain damages plaster and decorations in the dwelling, the repair to the interior can be collectible under the policy, *providing* the rain entered the building through the openings caused by the wind. Repairs must be made soon, though no time limit is set.

Wind damages to shingles causes insurance companies their biggest headache. From the dollars and cents standpoint they are not among the biggest claims, though they do cause most of the grief. Adjustments on shingles are worked out on the basis of their price on today's market plus the expense of laying them, minus depreciation. A composition shingle roof is assumed to have a 20 year life. If it would cost $50 for shingles and $50 for labor to repair a roof damaged by wind, the expenses would be $100. If the shingles had been on 10 years the insurance company would assume that the owner had received 50% of the life, of the shingles and would pay him for the 50% of the shingle life he lost. The claim, theoretically, would be settled for $50. Although insurance companies will complain about neglect after a loss, they rarely refuse payment. If arson is involved they of course won't pay.

Insurance companies have a provision in their policies (and this is true of practically all companies) that the insurance is void if there is any unreasonable increase in hazard. They can use this if neglect reached serious proportions and a bad loss resulted. Who is to judge what is an increase in hazard is always subject to debate, though it is this provision which has prevented the use of heat lamps in brooders. This "increase in hazard" is a nebulous thing, and theoretically could cause trouble, though actually it doesn't.

3. *UNINSURED BUILDINGS:* If your farm is fully equipped with buildings, the chances are about even that one or more of the buildings are not insured. They might have been overlooked when the policy was written or were not bought into the policy after they were built. If a building *isn't* listed in your policy that building *isn't* insured. If you put up a new building, even a one-sow hog house, have it added to your policy. If you tear a building down, have it removed from your policy. It will reduce the premium.

The same is true of grain inventories and household goods. These items are often overlooked. Though your dwelling may be insured, the household goods inside aren't insured unless they are specifically listed in your policy.

4. *BUILDINGS INSURED BUT NOT ON THE FARM:* It gives a farmer a sinking feeling to find after a loss on a building he forgot to insure that he is still paying a premium for insurance on buildings long since taken off the farm. It is painful to be told by an adjuster that you cannot collect because the building damaged was not insured, and realize at the same time you have been paying the insurance company a premium for a building that doesn't even exist. This may sound fantastic, but there's a fifty-fifty chance it is happening to you right now. If you have a building listed in your policy that isn't on the farm, it's wasting money in exactly the same way as a leaky water faucet.

Woodrow Allen, who lives in the

SUDDEN DEATH and destruction—all hell has broken loose—the crib was insured, but the farmer forgot all about the corn.

southern part of Douglas County, Nebraska, is a sadder and poorer man because he didn't check this point. His machine shed disappeared into the next county when it took off in the strong wind of March 7, 1951. He and his son had built this three years before, largely from lumber taken from an old barn. When he got out his policy after the loss, he was horrified to find that this machine shed, worth at least $2500, had never been insured. Sam hadn't recovered from this shock when his agent dryly reminded him that over the past three years he had paid $41.08 for insurance still carried on the old barn. This was insurance on a building that hadn't existed for three years. Policies, especially those which are paid up for a number of years, should be checked regularly to see that they accurately reflect only the buildings on the farm—no more, no less.

5. *TWO OR MORE FIRE INSURANCE POLICIES:* An unusual feature about farm fire insurance policies is the requirement that each company must give permission before additional insurance can be placed with a second company. If this permission, in writing, isn't obtained, both policies on the building are void, and neither company can be forced to pay in event of a loss. This doesn't create a serious problem. If you have more than one policy, ask all the agents who wrote the policies to give you permits for the other insurance.

The need for this endorsement came about after a sharp operator planned to have several fire insurance companies help him pay off a $5000 mortgage on his farm. Having a barn worth not much over $1000, he purchased five different insurance policies from five different agents in five neighboring towns, each policy for $1000. One dark night the barn conveniently burned to the ground, and he actually collected $5000, $1000 from each policy. Considerable time went by before some neighbors suspected what had happened, and word eventually drifted back to the insurance companies that the fire probably resulted from friction caused by the insurance policies rubbing against the mortgage. The bright individual who dreamed up this plan spent the next ten years in the penitentiary for arson, and insurance companies now check every claim against the possibility of this being repeated.

A year ago a farm management company had a farm turned over to it with $60,000 worth of insurance carried on buildings valued at $15,000. Five policies were written, incurring a $400 a year premium, yet none of the companies knew other companies were on the risk. As a result all five policies were void. There is nothing wrong with having several companies, *if* permits have been obtained from each company. Insurance is no cheaper when placed with more than one company. As a rule the only reason more than

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ABOVE: A quick and adequate water supply not only reduces insurance premiums but saves many a farm building against total loss. LEFT: One gone, the other going. Fires generally do a complete job on farm buildings. BELOW: In areas such as this livestock insurance is high, but the loss of a herd of cattle is higher.

. . . give a man a bitty piece of pie?

LILLIE BAINUM COOKS FOR THRESHERS

BY JOANN BELL PIERCE

When the longest days came and the fields of shocked grain danced under the July sun, the threshing teams started around the rings. The old timer will tell you it was a hot, dirty job, but it had its compensations—threshing dinners made harvest time for the threshermen like a summer of picnics. Every housewife in the ring tried to outdo the ones before her in the table she set.

The old horse-drawn engines, and the steam tractors that followed them, are gone now, and with them the threshing dinners, the all-time peak of American cooking. "Back yonder when I was a girl in Kentucky," Mrs. Lillie Bainum says, "how we looked forward to threshing. What a grand time it was!" For a moment this lively sprig of a woman, who has seen fifty years of farming in Ohio, is silent. She folds her hands in her lap and her quick blue eyes are softened by remembering—but for a minute only, because Lillie Bainum loves to tell a story, and this is one of her favorites.

"It was generally in late July or early August that Mama would call, 'Run fetch me a basket of apples, Lillie. The threshers have sent word that they'll be here tomorrow and there's pies to be baked.' Then she was on her way to catch half a dozen or so fryers to dress and put in salt water for the next day."

Mama, Mrs. Bainum says, was a real pusher. She had to be. Papa died when Lillie was just a little girl and Mama had to carry on alone and make a go of the farm and the family. There were seven boys to be taught how to handle the crops and three girls to teach how to sew a fine seam, or patch a shirt, or turn out a batch of biscuits. If the boys were ever undecided about things, they went to Mama. Maybe, at tobacco setting time, they came in and asked her to help pull plants. They were raised, the ten of them, to heed what she told them.

At threshing time, while the engineer got his fires going and the men were standing around waiting until the dew was off the sheaves, Mama and the girls were in the big kitchen seeing that their stove was fired up just right, getting the dinner underway, and setting the dining table, which had to be lengthened to a full twelve feet.

Neighbor women came over with their men, who were trading work. They knew that Mama, with three girls, didn't need any help, but they liked to be with them, especially on threshing day. "They were all just anxious to eat at Mama's table," Lillie Bainum says.

There were often as many as twenty hands. The first note of the dinner bell had hardly sounded before the threshing crew and the men who worked around the separator came in for the first setting. After they were through and the dirty dishes had been readied up and the empty bowls filled, the others came, those who were pitching sheaves in the field, and those who had teams.

"We always knew where the engineer sat because the cloth at his place was a sight when he finished," Mrs. Bainum says. "He went with his sleeves rolled up and was grease all over. Mama gave him good lye soap to wash up with before dinner, but he didn't scrub all the grease off. We were used to it, though, and never thought much about it—though Mama would never use her best cloths on threshing day."

The table groaned under the weight of food when the men came in. There was a platter of fried chicken at each end of the table and platters of baked ham beside them. The dishpan full of potatoes which had been peeled earlier in the morning were mashed or creamed so that the men could have their choice. There was boiled cabbage, cole slaw, apple sauce, garden peas, green beans and noodles. And great bowls of chicken gravy and ham gravy to go along with the mashed potatoes and hot biscuits. Hot biscuits, if you please, with

. . . run fetch a basket of apples. There's pies to be baked.

. . . Mama and the girls were in the big kitchen seeing that their stove was fired up just right, getting the dinner under way.

butter and grape and apple and blackberry jelly and preserves, too. Good cool milk was brought up from the spring house and coffee and ice tea were there for those who liked them.

"Mama most generally made apple pies and chocolate cake for dessert," Mrs. Bainum says, "and, as a rule, there were chipped up peaches, too. The cake and pie were passed around on a big tray. You'd never get Mama to cut a pie in any more than four pieces, either. 'Law!' she'd say with a laugh to poke fun at you if you started to cut one in anything but quarters, 'Give a *working* man a little bitty piece of pie?'

"She always made the biscuit dough herself—with her left hand, too, which I could never do. She used a great big wooden tray for mixing and had two pans the size of the oven ready before she called the men in to dinner. The biscuit dough was made with sour milk— or buttermilk or clabber—and those biscuits would raise so high when Mama made them. She allowed eight biscuits to a man.

"We had a big wood-burning range, of course, and always baked in it. The gas stove I use now in hot weather does make good biscuits, but it doesn't bake like our old wood range did; no indeed."

When she knew the threshers were coming, Mama would scour and scrub the wash kettle, and then scrub and trim a big country-cured ham to boil for the next day. Mama's fried chicken, Mrs. Bainum says, was famous all over the county. She had mostly Plymouth Rocks and raised them herself. Even without a brooder, she would put down 500 or more at a time with setting hens.

After dressing, she soaked the chickens in weak salt water over night. When she was ready to fry them she cut them up. She put a large pan on top of the range and heated the lard and butter, about half and half, enough to about cover the chicken. Every piece of chicken was rolled in flour, put in the hot grease, then pepper was sprinkled over it, and the pan was then placed in the hot oven.

"With those old wood ranges you could do this and the chicken would come out as brown and pretty as it could be.

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The Uninvited Guests

The poor doer is often host to uninvited guests, worms of every shape and size, which rob him of his food and damage his organs.

BY JACK BAILEY, D.V.M.

The uninvited guests that sit at a farmer's table—the worms that infest his livestock—can eat him out of house and home. They steal feed from his animals; they cost livestock owners millions of dollars every year. There isn't a domestic animal or bird that isn't affected by some sort of internal parasite. Hogs, sheep, cattle and goats are particularly susceptible.

Worms can be grouped in three big classes according to shape. They are roundworms or nematodes, tapeworms or cestodes, and flukes or trematodes. Most of these are found in various parts of the digestive tract, but some of the roundworms live in the lungs, and at least one species is found in the urinary tract of swine. In this article we will consider the more important ones affecting cattle, hogs, sheep and goats, together with symptoms, methods of establishing a diagnosis, treatment, and preventive measures. Worms in poultry is a big subject in itself, and worms in horses have ceased to be a common problem.

Worms in Cattle

Let's start off with roundworms in cattle. According to species, they have favorite living quarters in various parts of the stomach and intestines. They aren't large, some of them being hard to see with the naked eye, but they carry imposing names like Ostertagia ostertagi, Haemonchus contortus, Cooperia oncophora, Nematodirus spathiger, etc. Farmers are likely to know them better as stomach worms, hair worms, wire worms, and others not printable. They cause damage through interference with normal digestion and blood-sucking, which results in anemia. The life cycle is pretty much the same for all of them.

The worms lay eggs which pass out with manure, and in warm, wet surroundings larvae hatch from them within a day or two. After hatching the larvae reach the so-called "infective" stage in about a week. These larvae are able to move about; they can climb wet grass blades and spears of hay to increase their chances of being eaten by cattle. Wet ground and shady surroundings make them healthy and happy. Once swallowed, the larvae of most species burrow into the lining of the digestive tract, where they begin to eat tissues and suck blood. About eighteen days after being swallowed the larvae develop into adult worms and either remain attached to the digestive organs or circulate through the surrounding digestive tracts. In either

case the females soon begin laying eggs to start the vicious cycle all over again.

Affected animals aren't really sick in the early stages, but they just don't do right. They often eat their heads off, but they don't grow, and are runty for their age. Advanced cases are rough-coated and pot-bellied and skinny and weak. Their eyes are sunken and they act like they're half asleep and don't give a damn. In the late stages a watery or bloody diarrhea is apt to appear and make the poor critters even thinner. Fluid may accumulate in the throat and cause a condition commonly known at "bottlejaw"; deaths are not unusual. Such symptoms are usually confined to young stock, since previous exposure generally gives considerable resistance to older animals. Outbreaks may occur at almost any time during the pasture season, but the most serious ones generally come in the early fall months.

When cattle are seriously infested with stomach worms, there are two ways of establishing a definite diagnosis. One consists of mixing a manure sample with a saturated solution of sugar or salt and letting it stand for fifteen or twenty minutes. Worm eggs will rise to the top if they are present. They can't be seen with the naked eye, so some of the liquid is examined under a microscope. Eggs prove the presence of worms, but this doesn't rule out the possibility of some other disease.

The second method of diagnosis may be a trifle heroic, for it involves opening up dead animals and investigating the digestive tract. It is best to take samples from different parts of the digestive tract, since some species of worms aren't apt to stray beyond certain boundaries.

Several good remedies are available, but they are all dangerous to some extent. This is because any drug capable of killing worms is also capable of killing animals when used carelessly. Accordingly, directions must be followed to the letter. It is particularly important to make allowances in the case of weak or stunted animals, which may not be able to handle a dose ordinarily considered as safe.

Phenothiazine is probably the most practical remedy, since it is comparatively safe, and effective against most stomach worms. Calves are first starved for 18 to 24 hours and then dosed at the rate of two-thirds ounce per 100 pounds, with no animal receiving more than two ounces. Weak or stunted calves shouldn't get over two-thirds of an ounce. The treatment may be repeated in three weeks, if necessary.

A so-called "Cunic" solution can also be used for the removal of stomach worms from cattle. It is made by dissolving two ounces each of copper sulfate and Black Leaf 40 in a gallon of water. Mixing should be done in a glass, wood, or clay container, since copper sulfate doesn't agree with most of the metals. This preparation has the disadvantage of being quite dangerous to use, since both the active ingredients are highly poisonous. Recommended dosage calls for 3 ounces to every 100 pounds of live weight, with no animal getting over nine ounces. Treatment with Cunic can also be repeated at three-week intervals if needed.

Worms in Sheep and Goats

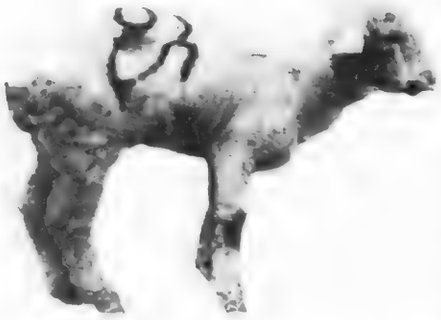
Sheep and goats are also affected with roundworms similar to those which pester cattle. Symptoms are similar, except that previous exposure doesn't seem to give much added resistence in goats and sheep. Consequently, adults may be affected almost as badly as the young animals.

Phenothiazine is probably the safest and most practical remedy for roundworms in sheep and goats, too. This may be given either as a drench, in capsules, or mixed with feed. Regardless of how it's given, the dose for adult animals is about an ounce, with a slightly larger amount for animals weighing over 150 pounds. Lambs and kids weighing between 50 and 70 pounds will need half-ounce doses. A pound of phenothiazine will then be enough to treat about 15 adults or 25 young animals weighing less than 70 pounds.

Phenothiazine can also be mixed with salt and supplied as the only salt the flock has during the grazing season for the control of stomach worms. A suitable mix can be made by adding one pound of phenothiazine to every ten pounds of salt. Milk from goats or cows that are fed phenothiazine should not be used for human consumption. Since medicated salt alone can't be depended on for the control of stomach worms, it's recommended that sheep and goats be wormed before going to pasture in the spring, and again in the late fall. When pastures are heavily infested it may be necessary to treat the animals during the grazing season, too, even when medicated salt is available.

The Cunic solution mentioned for cattle can also be used against stomach worms in sheep and goats. This is given as a drench, with the following doses suggested: Adults, three ounces; yearlings, two ounces; 6 months-old lambs and kids, one and one-third ounce; 3 months-old lambs and kids,

ASCARIDS in swine grow to be a foot long. They damage the lungs and liver, clog up the intestines and rob the animal of nourishment, and often cause death in young pigs.



two-thirds of an ounce. Treatment need not be preceded by starvation, and animals may be immediately turned to pasture afterward. Due to the highly poisonous ingredients, occasional animals die shortly after being dosed with Cunic. Treatment may need to be repeated every month in heavily infested areas.

Even though effective remedies like phenothiazine and Cunic are available, preventive measures are a lot cheaper and more practical. Right here it will pay the farmer to pay a little attention to PPPP. Letters can stand for almost anything, but this group is a short way of saying that Permanent Pastures Propagate Parasites. A regular rotation of pastures will help no end in preventing infestation of your stock with stomach worms.

Exposure to the parasites is favored also by overstocking, spreading manure on pastures, poor drainage, and allowing animals to drink stagnant water.

There are a few other preventive measures which will help. You can prevent contamination of feed with manure by supplying grain in raised boxes and hay in suitable racks, since feeding off the ground increases the chances of larvae being swallowed. You can help quite a bit by separating youngsters from their dams as early as possible, since older animals are very likely to be immune carriers of dangerous worms. You can save yourself quite a bit of trouble by setting tanks in gravel on high ground so that surrounding areas don't become wet and loaded with worm eggs and larvae. Finally, you can isolate newly purchased animals for a month or more before turning them out with the rest of your livestock.

Worms in Swine

Swine aren't affected with true stomach worms, but they do harbor nodular worms, whipworms, and hookworms with life cycles similar to those of stomach worms in cattle, sheep, and goats. These worms are more commonly found in the southern states, and usually live in the intestines of infested pigs. They are all round worms, but none of them are so widely distributed as the big ascarids which also live in the intestines. The life cycle of this parasite is a little different from those in cattle and sheep.

Eggs are passed in the manure, all right, but they don't hatch into larvae at once. Instead, they take a few weeks to reach the infective stage and have to be swallowed again before they hatch. These infective eggs are tough customers. They are resistant to almost everything, and will remain alive in soil for several years. Once swallowed, the eggs hatch out young

worms, but these don't settle down right away. Some are carried out of the body and soon die, but others burrow through the intestinal walls and find their way to the liver, lungs, and other organs. They are generally carried to the liver by blood, and then to the lungs. They keep on growing there, and eventually crawl up into the back of the mouth so they can be swallowed and enter the stomach. They then move on through and set up housekeeping in the small intestines, where they grow up and start laying eggs of their own. It usually takes about two months from the the time infective eggs are swallowed until worms reach the adult stage. After that, hog lots may become infested in a hurry, for a single female will sometimes lay up to 200,000 eggs per day.

Ascarids cause symptoms a little different from those of stomach worms of cattle, although young animals are again the ones that suffer the most. Pigs which become infested shortly after birth may show signs of pneumonia within a few days, coughing and slobbering and having considerable trouble in breathing. They often have thumps, sometimes vomit, and fail to do well in general. Badly infested animals burrow under the bedding or crawl into dark corners, often dying in ten days or less. A light dose of worms may limit symptoms to coughing and stunting, but migration of larvae through the liver may cause yellowing of the body like jaundice; convulsions are also common results of liver damage.

A dead animal is likely to show damaged lungs and signs of pneumonia, while the liver is often sprinkled with whitish scars marking the paths traveled by larvae. Worms in the intestines are much easier to find, for they are white and sometimes a foot long. Worm eggs can sometimes be found in manure from older animals or soil samples taken from the lot in which they are kept.

Although a dangerous poison, sodium

fluoride is probably the most practical drug for removing ascarids and other intestinal worms from swine. It is best given as one per cent of one day's ration of dry feed. Treatment may be repeated in three weeks if necessary. Pigs are generally wormed at about ten weeks of age. The sodium fluoride must be well mixed with feed so all pigs will get equal amounts. It must not be given in slop, since it may settle to the bottom, so that the entire dose is eaten by the one or two pigs that

LEFT: Thornhead worms in swine attach themselves to the intestinal lining. Nodules show when heads have been attached. RIGHT: Lungworms taken from a cow. Cattle do not develop immunity from lung worms. Pneumonia often follows infection in young animals.

GOATS ARE HARDY ANIMALS but, like sheep, they have no natural defense against worms. The goat dairyman must be constantly on the alert; goats are wormed regularly. The best control is clean pastures in which the animals graze for about two weeks.

get the last of the feed. This is pretty sure to kill the overdosed porkers. Left-over feed must not be fed to chickens, either, for the one per cent mixture which is harmless for hogs is sure death for poultry.

Phenothiazine is also fairly effective against most intestinal worms of swine, and may be given either in capsules or mixed with feed. The dose is one-sixth of an ounce, or 5 grams, for pigs under 25 pounds; 8 grams for those between 25 and 50 pounds; 12 grams for those between 50 and 100 pounds; and 20 grams for those between 100 and 200 pounds.

The Junebug, that fellow who bangs on the screen door on summer evenings—plays a role in thornhead worms of hogs. Eggs which have fallen in manure from infected pigs are eaten by the June bug larva. These grubs live in soil in manure piles, stack butts, old orchards and woods. When the grubs or the adult beetles are eaten by pigs the porker gets a star boarder. The head of the thornhead worm is buried in the intestinal wall and his soft body is inside the intestine. The openings in the intestinal wall cause inflammation.

Since there is no cure for these worms, hogs should be kept away from them, either by nose rings or confinement to sunlit pastures.

A worm which parades under the fancy name of *Trichinella spiralis* sometimes causes a painful disease in humans when they eat uncooked or partly cooked pork. Hogs may pick up this worm in garbage or dead animals such as rats. The larvae reach maturity in the small intestines, penetrate the wall, enter the blood stream, and hole up in the muscle tissues. They are ready to go to work when eaten by other animals—or man.

Regardless of how efficient different treatments may be, prevention is much better than any kind of worming procedure for swine. This is because most of the damage is done by larvae that burrow through the lungs and liver, and removal of worms from the intestines is like locking the garage after your car has been stolen. For a long time now the so-called McLean County system of swine raising has been recognized as a practical means of keeping porkers free of worms and other parasites. It consists of five main parts:

1. Clean farrowing pens thoroughly with a mixture made by adding one pound of lye to 10 gallons of hot water.

2. Wash the sows with soap and warm water and put them in the clean pens three or four days before farrowing. The washing is advised to remove parasite eggs that may have a chance to infect the suckling pigs.

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SUPER-FLY

BY RICHARD WEINER

There are flies which can make a meal of DDT and suffer no ill effects—a few of them may feel groggy, but they will sleep it off and buzz right back to the milk room. In California they have found super-flies that are 300 times as resistant to DDT as their ordinary cousins. And Florida, not to be outdone, claims that its flies take ten times as long to kill with DDT as they did when this wonder spray was first used.

Fly resistance to DDT was first reported in Italy in 1946, two years after the Army had used it so effectively to defeat the threat of plague and of fly-borne diseases. Soon after the reports from Rome and Naples were made, resistant flies were found in northern Sweden, Egypt, and from many spots in United States.

From all indications, these flies have not acquired a tolerance for the stuff by occasional nipping, like an alcoholic: they were born with their resistance and pass it on to their young. These superior flies survive a DDT attack and go on to produce more of their kind. Soon the resistant flies outnumber the ordinary flies which have had the good luck to escape contact with the chemical, and the farmer has a problem on his hands.

Specimens of this tough fly have been trapped in all parts of the world. The super-fly from Sweden was found to be a little darker, hairier, and able to take cold weather better than most flies, but other resistant flies have shown only a few microscopic differences from any other fly. Even laboratory strains that have shown resistance 1000 times greater than normal do not appear to be physically unusual.

Two California scientists, A. S. Perry and W. M. Hopkins, have been struggling with the question: What makes these flies resistant? They believe that the answer lies in the ability of these flies to convert DDT, which is the chemists' abbreviation for dichlorodiphenyl-trichlorethane, into a harmless chemical with another jawbreaker name which has been shortened to DDE. This discovery led these scientists to work with another substance which will prevent this conversion. Though Perry and Hopkins are meeting with some success, their work is still in the laboratory stage.

Flies that can take DDT in stride, it was found, are also above normal in their resistance to other chemically related insecticides such as DDD, methoxychlor, lindane, toxaphane, and heptachlor. More important still was the discovery that these super-flies are just as killable as any other fly when sprayed with insecticides like pyrethrum, which are unlike DDT in that they do not contain chlorine.

Back to the Fly-swatter?

Farmers throughout the country have been discovering DDT resistance on their own and announcing their findings in their own way. "Super-flies!" exclaimed Paul Lowie, a farmer near Madison, Wisconsin. "You haven't seen one until you've been in my barn. Those flies can bathe in DDT that would almost kill a man. They just seem to lick their chops and ask for more. It seems as if the DDT makes them stronger instead of killing them." And like most practical men, he added, "I know there are DDT resistant flies; what I want to know now is, how do we get rid of them? It almost looks as though we're going to wind up with the fly-swatter as our only weapon."

Lowie is a little too pessimistic. The scientists *have* come up with an answer—as a matter of fact, they have produced two answers. One might be considered a day-to-day battle plan against the resistant fly; the other is more of a long term approach.

Short Work on Super-flies

The California scientists found that flies which were resistant to DDT and the related chemical insecticides fell easy victim to other, non-chlorinated material such as the pyrethrin compounds found in pyrethrum flowers. This gave them one sure-fire method of killing the super-fly. Its major drawback is that pyrethrum, though it has a powerful knock-down effect, has very little residual control. Flies can live happily on surfaces that have been sprayed a few hours earlier.

The recommendation is to use a space spray of aerosol which contains 0.1 per cent or more of pyrethrins along with piperonyl butoxide, a material which has no killing effect itself, but which adds greatly to the toxic effect of pyrethrum. This spray will have to be used at least once a day to be effective, but it *will* kill the flies that DDT won't touch.

James Johnson, an Illinois farmer who followed this recommendation, has said, "DDT worked fine for four years, but by last year the flies were so thick the cows could hardly breathe. When I switched to pyrethrum spray I cleared the barn up right now. This year there are plenty of flies outside, but I've got them stopped in the barn."

Other farmers agree that pyrethrum is the most effective insecticide for protecting cattle from many insects, particularly the blood-sucking stable fly. Used at a concentration of one per cent pyrethrum and one-tenth of one per cent piperonyl butoxide, this insecticide may be used at the rate of one to two quarts per animal twice a month. Used this way the cost runs to about a cent and a half a day for each animal.

AN EQUAL NUMBER of flies was placed in each cage; those on the left were ordinary flies; those on the right were DDT resistant flies. Both were given equal shots of DDT. Most of those on the left were killed; most of those on the right survived.

The Long Battle

Pyrethrum is the answer when the super-fly populations build up, and it is the answer to all flies if the farmer is willing to spray thoroughly every day, but there is a better answer. Two scientists from the University of Wisconsin have been working with the DDT resistant fly and have come up with some recommendations. They found that, though the fly which can take DDT is also resistant to other chlorinated compounds, their resistance to some of them is not great enough to completely protect them. They have found that methoxychlor and lindane and some other chlorinated compounds can still be used with success. This means that we can still take advantage of the long-lasting effects of the chlorinated sprays.

The Wisconsin scientists recommend: (1) Use proper concentrations. (2) Spray the walls and ceilings of barns, hog-houses, chicken houses, and other fly hang-outs. (3) Alternate several insecticides. (4) Make spot applications to favored fly resting sites. (5) Spray cattle and other livestock every two or three weeks in the summer. (6) Eliminate all fly breeding spots.

Concentration

In the past a few entomologists advised the use of a very low DDT concentration in order to prevent or postpone the development of a DDT resistant fly. It was believed that higher concentrations of spray would leave only true-blue, dyed-in-the-wool DDT drinkers to breed and produce their super offspring. It now appears that almost the opposite happened. Every fly with some resistance lived to produce more resistant daughters. It is now recommended that high concentrations be used which kill practically all flies. Pyrethrum will knock off the few that remain.

Walls and Ceilings

For general fly control, the walls and ceilings of barns and other farm buildings

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FLY CONTROL ON THE FARM

Insecticide	Best Use	Recommended Strength	Approximate Residual Strength	Fly Resistance*	One Treatment Cost**	Remarks
DDT	Building surfaces where flies rest. Livestock.	2.5-5% @ 1 gal. 1000 sq. ft. on buildings. 0.5% @ 1 to 2 qts. animal.	8-10 weeks inside or 3-4 weeks outside of buildings. 3-4 weeks on animals.	4	$0.25-0.50 1000 sq. ft. on buildings. $0.01-0.02 /animal.	Not for dairy buildings nor dairy animals.
Methoxychlor	Building surfaces where flies rest. Livestock.	2.5-5% @ 1 gal. 1000 sq. ft. on buildings. 0.5% @ 1 to 2 qts. animal.	7-9 weeks inside or 2-3 weeks outside of buildings. 2-3 weeks on animals.	1½	$0.35-0.70 1000 sq. ft. on buildings. $0.02-0.03 /animal.	The only residual insecticide for both dairy buildings and dairy animals.
Chlordane	Building surfaces where flies rest.	2.5-5% @ 1 gal. 1000 sq. ft. on buildings.	8-10 weeks inside or 3-4 weeks outside of buildings.	....	$0.35-0.70 1000 sq. ft. on buildings.	Not for dairy buildings nor any animals.
TDE	Building surfaces where flies rest. Livestock.	2.5-5% @ 1 gal. 1000 sq. ft. on buildings. 0.5% @ 1 to 2 qts. animal.	7-9 weeks inside or 2-3 weeks outside of buildings. 2-3 weeks on animals.	1⅔	$0.30 1000 sq. ft. on buildings. $0.015-0.025 /animal.	Seldom recommended. Not for dairy animals.
Toxaphene	Building surfaces where flies rest. Livestock.	2.5-5% @ 1 gal. 1000 sq. ft. on buildings. 0.5% @ 1 to 2 qts. animal.	7-9 weeks inside or 2-3 weeks outside of buildings. 2-3 weeks on animals.	1½	$0.20-$0.40 /100 sq. ft. on buildings. $0.008-0.016 /animal.	Not for dairy buildings nor dairy animals.
Lindane	Building surfaces where flies rest.	0.6% @ 1 gal. 1000 sq. ft. on buildings.	3-4 weeks inside. Few days outside.	2⅓	$0.60 1000 sq. ft. on buildings.	Not for animals.
Pyrethrum	Space spray, and on livestock.	Grade AA or better. 1 to 1.5 oz. per animal.	(Only) quick knock-down plus variable degree of kill.	1	$0.015-0.02 /treatment animal.	Some formulations impart odor to milk. Some irritate animal's skin.

This figure indicates the number of times the insecticide must be multiplied to kill resistant flies over the amount used to kill sensitive flies. Thus, it takes 4 times as much DDT to kill DDT-resistant flies as it does ordinary flies.

Approximate cost of insecticide as wettable powder (except pyrethrum which is oil-base). Emulsions usually cost more and may present some hazard on animals.

Red Poll owners believe them the best of the dual purpose breeds. They quote beef and milk production to support their claims.

The Red Polls

BY CHARLES KOCH

Levi Bowman, of Covington, Ohio, is not in the dairy business, but he uses a fourteen-unit milker. His milker is fourteen calves he is raising on seven big bodied, good uddered cows.

"We never raise less than two calves to a cow," he says, "even if we have to go out and buy some extras."

Bowman is a Red Poll breeder who has found the market for his scarlet, muley cows so strong that he has quit the dairy business and is devoting his entire time to raising breeding stock. He is a Dunkard, a soft-spoken, simple-living, reticent man, but his reputation as a producer of Red Polls of the highest quality is nation-wide, and his pride in the breed is something that just can't be suppressed. Red Polls are sacred cows to their owners.

The Red Polls are an English breed. They originated in Norfolk and Suffolk Counties which jut out into the North Sea to form the eastern extremity of the British Isles.

A hundred and fifty years ago there were no Red Polls as such —just Norfolk and Suffolk cattle. The Norfolks have been described as being "a small, hardy, thriving race, fattening as freely and finishing as highly at three years old as cattle in general do at four or five. They are small-boned, short-legged, round-barrelled, well-loined, thin-thighed, clean-chapped: the head, in general, fine and the horns clean, middle-sized, and bent upward; the favorite color a blood-red, with a white or mottled face."

The Suffolks were larger than their northern neighbors, rougher in appearance, loosely coupled, polled, and excellent milkers. In color they ran anywhere from red to a cream color and were sometimes referred to as the "Suffolk Duns."

Red Polls started way back when John Reeve was a tenant on the Holkham estate of Thomas William Coke in north Norfolk in 1786. He had kept "a large dairy of cows" but had a low opinion of them, stating one day to an inquirer that they "are the worst stock that can be kept on a farm, as turnips are drawn for them instead of being fed on the land, and more straw is eaten by them instead of being trodden than by other stock."

Then soon after the turn of the nineteenth century, Reeve began to get an idea that it might be possible to breed a type of cow that would be a top producer of milk as well as the dam of a calf that would feed out well and make the butcher happy.

It had been the custom to spay the old Norfolk heifers and feed them out. And while this practice had produced excellent beef, it was very hard on the breed and the "homebred" Norfolks were verging on extinction.

Reeve crossed the red Norfolk cattle with the larger, better milking, polled Suffolks. Then in 1808 he exhibited before his

fellow members of the East Norfolk Agricultural Society a hornless red bull of his own breeding which was judged worthy of the Society's premium. Two years later he exhibited with equal success a bull and two heifers; the new breed had been launched.

For a time undue emphasis was placed on milk production to the detriment of the beef qualities, but eventually the beef characteristics were again given their proper consideration and by 1862, when the breed was first recognized by the Royal Agricultural Society Show as Norfolk and Suffolk Polled, the dual purpose type was well fixed.

Known today simply as the Red Poll, the breed has made itself popular in the counties of England adjacent to those of its foundation and has spread to the United States, Canada, Australia, New Zealand, South Africa, the Carribean Islands, and parts of South America.

It is not improbable that colonists coming to the United States from East Anglia brought with them some of these cattle. Though unregistered and of no known pedigree, many a good producing muley cow up and down the Atlantic coast bears the indelible stamp of remote Red Poll ancestry.

In New England, particularly, polled cattle have been favorites since a polled Suffolk heifer was landed at Boston in 1847. That was the year of the famous Irish potato famine. The Irish of Boston had sent a shipload of food to their native land and as a token of gratitude a citizen of Cork presented the master of the ship with the heifer which he brought home and auctioned for the benefit of the relief fund.

Descendants of this heifer became known as "Jamestown cattle," after the name of the ship which brought her across.

The first official importation of Red Polls was a bull and three heifers brought to New York in 1873 by a G. F. Taber. Two years later Taber brought over four cows and in 1882 he imported three bulls and twenty-three heifers.

Red Polls, as a breed, date from the first English herd book which came out in 1874. The first American herd book was published in 1887, three years after the organization of the Red Poll Cattle Club of America. Only cattle registered in the English herd book or cattle descended from cattle registered in the English book were accepted for registry in the American book.

At the close of 1951 there were some 2,600 Red Poll breeders in the United States and the breed was just beginning to catch its second wind.

Why the Red Poll?

The Red Poll people say that because most farmers are not specialists, they should not be handicapped in their operations by the use of specialized livestock. Here is the farmer's dilemma as they see it:

"Many a farmer using dairy bulls finds that, if he is lucky enough to get one that will transmit production, at least a portion of his heifers will develop into cows which can be milked profitably. At the same time, he discovers that the bull calves and the heifers which prove to be poor producers cannot usually be marketed for even the cost of their raising. So he procures a beef bull to use on his dairy cows and finds that the half-blood calves feed out well enough usually to make a profit when marketed. Then his cattle business becomes more profitable, for he has plugged one of the leaks through which his profits drained. However, when the time comes to develop some heifers into replacement cows, he finds that he has again missed the boat, for in most cases many of the milk producing genes of the dam are lost through the use of the beef sire. Concentrating desirable milk production ability in a breed of cattle is a difficult thing to do and an easy characteristic to lose. He then has three choices of remedying the situation. First, he can go out and buy some replacement cows to milk—an expensive process. Second, if his cows are still in breeding condition, he can buy another dairy bull and proceed to raise his replacements. In doing so, he will again take a financial beating when he markets the bull calves and the cull heifers. The third alternative is without doubt the most logical—convert to a dual purpose breed—stay in the middle of the road at all times." And it isn't hard to guess what the Red Poll people recommend as *the* dual purpose breed.

GEORGE SASS & SONS, Grand Island, Neb., furnished these steers for a beef feeding experiment by the U. of Nebraska. They dressed out 60.63%, graded good to choice.

The Architecture of the Beast

Red Polls are naturally hornless and a solid cherry red in color. On these two points the breed requirements are rigid. Scurs or any evidence of any kind of a horny growth whatsoever on the head are grounds for disqualification for registry as well as in the show ring. It is even provided in the rules that registered animals that later develop horns or scurs shall have their registration cancelled and all their progeny are debarred from registration.

The solid red color may be broken by white only in the switch of the tail and

THIS COW on the Pinney-Purdue farm raised the three calves, kept in top condition.

ROY TRUSTER, Collinsville, Ohio, meditates on his new calf crop while his herd sire, Avalon Gypsy's Pat, 1948 junior champion, takes a long drink of water.

on the underline no farther forward than the scrotum or navel. Incidentally, the calves are dropped with tails that are all red. White begins to appear in the switch at about twelve months.

The nose is another point on which Red Poll breeders are touchy. The nose should be flesh colored. Those that are cloudy or have dark spots are considered decidedly objectionable, so much so that calves dropped after July 1, 1952, with solid black or solid blue noses will be ineligible for registry. While it is frequently argued that a nose gives no milk and makes no beef, the breeders seem to agree that these off colored noses are nature's warning of an outcross in the strain and that culling is justified whenever one pops up.

The Red Poll cow is a big bodied animal that might be described to the uninitiated as being just a bit old fashioned in type. The dairyman may object that she lacks that triangular frame to which he is so accustomed and the beef breeder may consider her just a bit too light and long and possibly too leggy. But any admirer of good stock will have to admit that somehow or other she has what it takes to fill the eye as a good, honest farm worker.

She is in general an extremely docile animal, with a deep, fairly wide and moderately long body. She has a moderate length of leg and usually a very good, straight top line. Her general appearance could probably best be summed up in that much overworked word, "smoothness": here, however, it is particularly descriptive, for the good Red Poll is quite free from that general angularity that so characterizes her dairy-bred sisters. She exhibits little of that prominence of hip and openness of shoulder. While her bone is not nearly as large as might be expected in an animal of her size, it can more fairly be described as medium rather than light.

Her weight usually ranges between 1200 and 1500 pounds.

Her head is short to medium in length, wide between the eyes with the poll well defined and prominent. The ears are of medium size and prominent.

The Red Poll bull usually weighs anywhere from 1700 to 2200 pounds. He follows the same general description as the cow with, of course, emphasis on the masculine features. He is of a fairly gentle disposition, being much quieter and more tractable than most dairy bulls and is, of course, completely shorn of his weapons of offense.

For a little more refined description of the fine points of the Red Poll, listen to Douglas Cobbald. Mr. Cobbald is an English breeder who has judged at most of the important shows throughout the British Isles. Starting with the head, he says: "A broad muzzle is a first requirement. A cow eats for approximately eight hours out of every 24 and in that time she needs to get some 150 lbs. of grass. It stands to reason that a 3½-in. mouth is a better tool for that job than one only 2½-in. wide.

"I like to see my cows with a kind eye. This indicates quietness and docility without which it seems that high butterfats are not to be obtained.

"I demand a good deep body and a strong loin to help her when she is carrying a calf weighing perhaps 60-70 lbs. while still milking.

"The tail must be well set in. It is my experience that many of the high-tailed cows are generally difficult to get in calf.

"My cows must have a well-attached udder. That means that it must reach not only well forward, but also well up behind. Such an udder will seldom become pendulous. I lay great stress on this because a pendulous udder is prone to damage which so very often gives rise to mastitis.

"A dairy cow must be a good walker. We like to be able to describe our beasts as looking like 'a barrel with a leg at each corner.'"

Although Cobbald seems to be stressing the dairy characteristics of his cattle, he would be among the first to deny that they are strictly dairy animals. For all Red Poll people insist, first and last, upon the dual purpose of the breed. There is no question about this in the United States and in England. Cobbald has been one of those in the forefront in urging farmers not to neglect the beef potential of their cattle in an effort to free Britain from her dependance on foreign beef.

H. P. Olson & Sons' MODEL QUEEN, the Association's 1951 first in best udder class.

But since this question of milk has come up, what can the Red Poll do in that department? The Red Poll Advanced Registry program requires that a mature cow produce 300 pounds of butterfat in 365 days.

Red Polls Average 4.16% B.F.

In 1951, the top AR cow of the breed was 92873 Lill Advancer, owned by Roy L. Mueller, Arlington, Minnesota. Lill, an 8-year-old, produced 14,393 pounds of milk and 698.5 pounds of fat. The average for all Red Poll cows 60 months of age and over was 8,626 pounds of milk and 355.3 pounds of fat. That's milk of a 4.12% test. The breed average for the year on cows and heifers of all ages was 7,599.8 pounds of milk and 315.9 pounds of fat, for an average test of 4.16%.

Roy Mueller, the owner of last year's top cow, started his farming operations 30 years ago on a 220 acre farm with around 15 head of straight dairy cattle. Finding he always had more roughage on hand than his herd could dispose of, he decided to try to feed out a few calves for beef. This led him to consider dual purpose cattle and he finally picked Red Polls

because, as he says, of "the even color and also they did not have any horns to contend with." During the first few years of his Red Poll ownership he kept his heifer calves and vealed the bulls. With the calves being dropped at around 70 pounds and making excellent gains, he was making top quality veal. Then as he found the demand for Red Polls growing, he began to sell his top bulls, castrating and weeding out his plainer ones. These latter went to market at 16 to 18 months of age, always well fleshed and dressing out to a high percentage. As time went on, he says, "The demand for breeding stock became very good and from 1940 we have not sold a veal calf or steered any of them for beef."

Mueller now owns 52 head of Red Polls. He belongs to the Sibley County D.H.I.A. in which there are 26 herds on test, only one other being a dual purpose herd, the rest all straight dairy herds. He says, "For the years ending 1949 and 1950 our herd bred and owned the top individual cow of the testing association. In 1949 this cow produced 735.8 lbs. of butterfat and 16,057 lbs. of milk. For the year 1950 she was again high cow of the association with 732.4 lbs. of fat and 14.781 lbs. of milk."

As to their ability to stand the cold Minnesota winters, he testifies: "Our cows are confined to stanchions from about the middle of November until they go out on grass, which is usually about the middle of May in this area. Every cow is turned out for a little while each day, depending upon the cold. We have turned them out in 30 below weather for 15 to 30 minutes and have had no trouble with them catching cold or freezing their udders."

Many other breeders have had the same experience as Mueller in that they were dairymen who turned to Red Polls to better utilize their time and available feed supply. They were well pleased with the change but suddenly found themselves confronted with such exceptional opportunities in the sale of breeding stock that dairying soon became a sideline or dropped out of the picture all together.

Roy Truster, of Collinsville, Ohio, is one of these. He used to have a Jersey dairy. Now he raises Red Polls and milks none of them, nor do any but the culls go for beef. George Rice and his son-in-law Roger Stickel, who operate under the name of Risickel Stock Farm at Troy, Ohio, are two more; while John Schmiesing of Ft. Loramie, Ohio, who is probably the dean of all Ohio Red Poll breeders, having been in the business since 1906, says he finds the demand for breeding stock stronger than ever.

How About Beef?

When it comes to making beef the Red Polls again present a creditable record. As a matter of fact, it was their beef producing ability that originally attracted his family to the breed, says John Schmiesing. "My father used to feed steers. Generally used Shorthorns and one time he got hold of a real good one he thought was a polled Durham—you know they used to call Shorthorns Durhams. Well, he liked this red one a lot and found out it was a Red Poll. That's what got us into the breed."

Purdue University's Pinney Purdue Farm herd disposed of some Red Poll steers not long ago that weighed 1280 pounds at 23 months of age. They brought only $1.10 under the day's top on the Chicago market.

John Schmiesing reports that he cuts and feeds out his plainer bulls and that they always grade "good" when they go to the yards. Furthermore, those he has butchered for family use have always dressed out better than 60%.

Last year the University of Nebraska ran a grazing experiment with 11 head of Red Poll steers. Turned out on May 29 at average weights of 653 pounds, the steers ran on brome pasture for 133 days. They received no grain, hay or supplement and gained an average of 1.75 pounds per day.

Another recent test at the Nebraska station reported Red Poll steers gaining 2.25 pounds per day on dry lot as compared with gains of 2.37 pounds per day for beef bred steers on a similar ration. The carcasses from the Red Polls graded "good" and they dressed out 59.66% compared with 60.82% for the beef bred steers. The rather inconclusive report pointed out that there was as much variation within breed as between breeds when it came to comparing the carcasses.

Red Polls have established a firm beachhead in the cattle country of east Texas. J. R. Freeman of Leggett says that his Red Poll cows are some of the best range milkers that can be found anywhere.

"They will raise a calf without feeding through the summer and early fall months and those calves are always the kind that can forage for themselves and have the frame to put on weight. They can withstand cold weather and make the winter on average amounts of feed. Stockmen find that the increased milk production of the Red Polls means larger calves and wider profit margins."

Red Poll Crosses

Another spot where Red Polls are being welcomed with enthusiasm is in up-grading and crossing in beef herds, particularly in the south. The Bowmans have a customer in Mississippi who has been traveling north for the past few years buying Red Polls until he now has a whole herd of them used exclusively for

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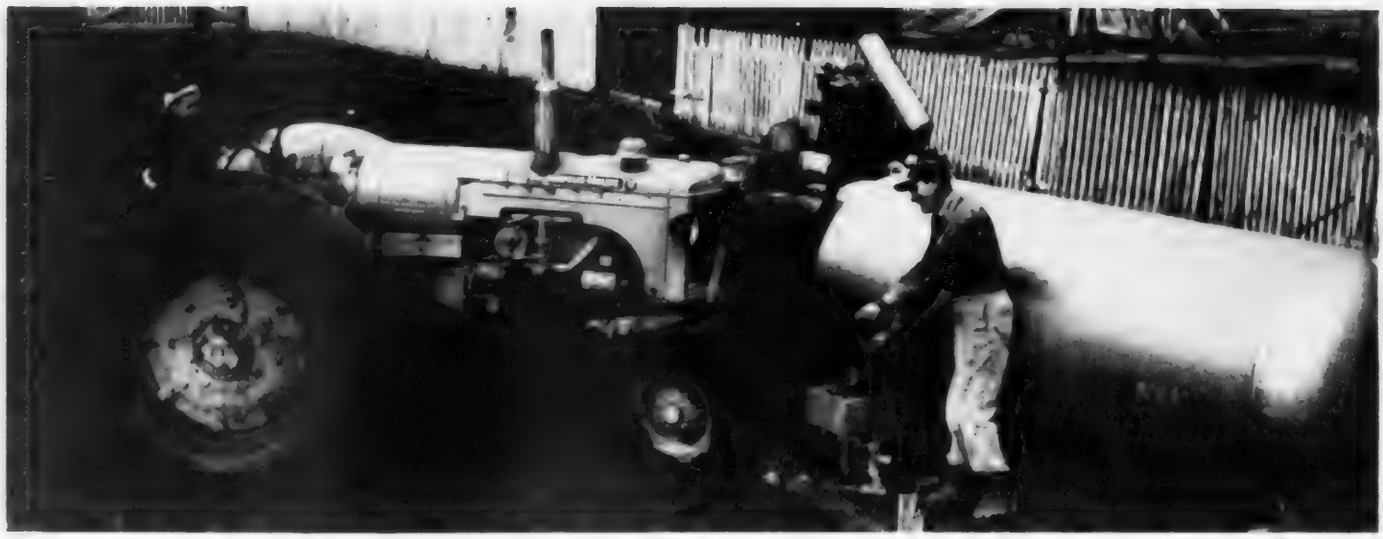
"THE EYE of the farmer fattenth the ox," an ancient saw, but still the best formula.



Clyde Johnson fills his L. P. tractor from his 1,000 gallon tank which also supplies heat and fuel for his home. Johnson is careful to follow his insurance company's recommendation that the tank be at least 50 feet from the house or barn.

L. P. Gas for farm tractors

What is L. P. Gas, how good is it, what will it cost to change over, and what are its good and bad points?

BY J. MITCHELL SMITH

Some one has said that if you rub two farmers together they talk tractors. Sooner or later, these days, tractor talk gets around to L. P. gas — what is it, how good is it, should I change over, how much does it cost? There are more fancies than facts going the rounds about L. P. gas. When a farmer starts out to sort fact from fancy, he soon discovers that a tractor owner who has used L. P. gas can't be neutral about it; either he roams the countryside like an old time evangelist, trying to convert all his neighbors to L. P., or he swears that the gas is an invention of the devil and just as wicked.

The truth about L. P. gas probably lies somewhere between. But before we lift the engine cover and inspect the performance of the gas, let's answer some of the less important questions. First, what is L. P. gas anyway?

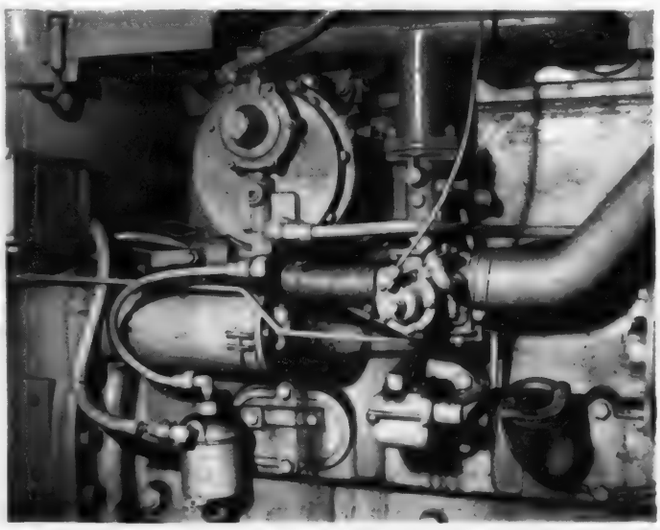
What Is L. P. Gas?

L. P., short for liquefied petroleum, is not a new product. A similar gas has been sold for many years, the common bottle gas used widely for cooking purposes in areas not served by natural gas. It is made from the gas which usually comes out of an oil well. This gas, because of limited local markets, was formerly allowed either to escape or it was "flared." That is, it was set afire at the well head and allowed to burn like a great torch until exhausted. Recent laws forbid the flaring of natural gases. The oil companies, forced to do something about the gas, began looking for markets, as they did years ago for gasoline when it was a by-product of kerosene. It wasn't much of a problem to convert a gasoline engine to a gas user, but this brought up a bigger problem. This was the transportation of the gas to the consumer, for it can be shipped only under pressure in expensive tanks. This is one of the limiting factors in the wide use of the fuel, since it can be made to undersell gasoline in many areas.

Any gas turns to a liquid under pressure. This is true of propane and butane of which L. P. is made. After being liquefied the gas is shipped in large, high-pressure tanks. In open air, the liquid L. P. "boils" away in a moment; it is highly volatile and explosive.

Two Ways to Change to L. P.

The two ways of using L. P. are: (1) buying a conversion kit and fitting it to your old tractor; (2) buying a new tractor, which is already designed for the gas. A good mechanic can convert a gasoline engine in a tractor, automobile or truck, by using one of these kits. The cheaper kits include a special, high-pressure tank, a vaporizer to warm the gas and convert it to the



FROM THE FUEL TANK, upper left, gas goes to the liquid filter, lower left, then to the high pressure regulator, which is mounted on the circular vaporizer. The gas is heated in the vaporizer and goes to the low pressure regulator near the carburetor and through the carburetor and manifold to the combustion chamber.

COUPLINGS COOL fast as high pressure L. P. gas flows through them. The cautious operator wears gloves to avoid frost bite. All valves and connections should be checked before refueling starts. A careless man has no future with an L. P. gas tractor.

proper pressure, and the necessary fuel lines and control gauges and adjustments; the more expensive, more efficient kits may include special sodium-cored valves, cold spark plugs, cold manifold, and a mechanical means of increasing the compression ratio.

The L. P. gas is under 50 to 175 pounds pressure in the fuel tank, depending on outside temperatures. Before it gets to the combustion chamber of the cylinder the pressure must be reduced to slightly below that of the atmosphere. In addition the gas must be heated in order to prevent freezing of the system. This heat is furnished by a vaporizer which is heated by water from the cooling system of the engine. L. P. gas is burned in the engine in vapor form. Vapor in the fuel system is used in starting.

Farmers will not use L. P. gas unless it is cheaper than gasoline. The exception is the odd one who likes to tinker with machinery, or one who just wants something different from what his neighbor has. Most of those who have gone to L. P. gas are doing it for a sound dollars and cents reason. Around the Texas and Oklahoma oil fields and other smaller areas where the gas is manufactured, it sells for as low as 7c a gallon. Since gasoline for farm use costs 17c to 20c a gallon in most areas, the cost advantage can be figured without the use of a very sharp pencil, providing, of course, that L. P. gas gives the same performance as gasoline. Practical tests of one whole day's work in the field have shown that the farmer gets as much work out of L. P. gas on a gallon for gallon basis because L. P. burns more efficiently, even though it has a lower B.T.U. content.

The cheaper the price of L. P., the greater the margin of saving. The 7c a gallon price holds in Texas and Oklahoma; Kansas, Nebraska, Colorado and California also have favorable price ratios. In the Midwest and in **(Continued on page 124)**

PLOT No 1: Broom sedge took over this plot after a six-year rotation of corn-oats-wheat-clover-timothy. The plot received no fertilizer treatment and is lower in fertility than if it had been continuously in grain during its sixty-three years of cropping.

PLOT No. 2: Three tons of manure were used on the corn, wheat, and first grass year in a six-year rotation on this plot. A few plants of clover remain after two years of timothy. Tickle grass preceded the broom sedge, which will soon take over.

PLOT No. 3: Complete fertilizer treatment during the rotation produced a lush stand of timothy which was grazed early in the spring and late in the fall and gave in addition three cuttings of hay. The soil in the three plots was identical 63 years ago.

FERTILITY *has no substitute*

BY WM. E. ALBRECHT

ONCE upon a time if a farmer stepped out of his kitchen door on a calm summer night he could hear the katydids calling, "Katydid! Katydid!" Today he is more likely to hear a murmur, coming from all quarters of the compass, "Go to grass; Go to grass!"

And farmers all over are going to grass. Grass will put their wornout acres back into production, they believe; corn and wheat won't grow on their fields, but grass will; happy days are here again.

But grass farming can be a trap. The trap is that bulk may be mistaken for quality. Going to grass is fine if you know what you're doing; but raising grass is tied up with soil chemistry, just as raising corn is, and we must be sure our soils are able to support a good crop before we put all our eggs in one grass basket. Some knowledge of the fundamentals of soil chemistry is needed if we are to grow good grass.

What are these fundamentals? Where is the trap, and how can we avoid it? When is grass farming profitable? The answers are to be found in three plots at the University of Missouri, three plots which have been watched by soil experts for 63 years. These plots tell the story of grass farming. Here, step by step, one may see all the factors for and against grass farming at work. Here is the story which the plots tell the farmer who has the patience to study them.

These plots show that grass farming is, first of all, a matter of soil fertility. If your soil is rich (or if you enrich it by fertilization) your grass farming will be profitable. If you have poor soil, the chances are you won't succeed. This seems a sensible conclusion, but it contradicts the general understanding of grass farming, which has been touted as the salvation of worn out soils. You may get a worn out soil covered with grass, but while grass will sustain mature animals, it won't *fatten* them. This is the trap into which many farmers in the East and Midwest have fallen under the slogan, "Go to grass!"

Let us go back to the beginning of farming in this country and review the picture of our soils. For example, let's take Missouri soils.

More Soil Acidity Means Less Fertility

Missouri's soils, typical of the north-central and eastern states, are highly washed-out, or leached, because of the 40 inches of annual rainfall. Originally much of these soils had timber cover. The leaching has caused these soils to become highly acid. In these shallow soils, most of the original fertility consisted of only what had been carefully hoarded by the roots of the low-protein, virgin vegetation, mostly trees. Below this thin soil is the subsoil. This contains much less fertility, and usually a much higher clay content, if not even a clay-pan. From that subsoil layer tree and grass roots had carried upward about all the nutrients they could during the ages past. The percolating rainwaters had carried the solubles downward until, at the present day, the clay is extremely acid and thereby deficient of nutrients for plants, animals or man. This excess acid, which we have been measuring with various laboratory gadgets, is merely another way of reporting the absence of most of the calcium, magnesium, potassium, amonia, manganese, zinc, etc., because of their displacement by acid (or hydrogen) particles.

These acid particles are not plant nutrients. An acid soil has poor structure, which causes it to erode excessively. It is also the cause of its low nutritional values when the crop grown on it are fed to animals. Shall we expect a grass agriculture, super-imposed on soils cultivated now for years and originally growing only trees, to give us forage crops of substance, other than woodiness, unless the soil feeds

THESE BROAD BACKS were not made from broom sedge. There are some dandelions here, but there are also brome and clover growing out of a well-fertilized soil.

the grass better than it nourished the trees?

On the other hand the virgin vegetation of the Mid-continent and the West was grass. It was the only type of plant which could survive through the dry summers. Survival was impossible for trees, hence forests were not native in those low rainfall areas. Yet the soils there under less rain water were not so seriously washed-out. They were not highly acid. Legumes grew naturally, on them. Grass roots dying annually added organic matter abundantly within, instead of on top of the soil. It is true that these soils were subject to wind erosion and yet the fertile, deeper layer remaining would grow more vegetation promptly with the next rain. Every season new organic matter was put into the soil to make it more fertile to grow more grass.

Such climatic, soil and vegetative conditions are quite the opposite of what prevailed with the humid soils covered with forests. Trees put organic matter down as leaves on top of the soil. There it added to the percolating waters, not nitrogen, but acid-forming products of decay, which robbed more completely the soils of their nutrients. The fertility of the soil under natural grass is high and quite the opposite of that where rainfall is regular enough to keep forests growing. If, then, the humid eastern half of our country with its virgin vegetation of forests is so widely different in fertility from the semi-arid, mid-continental section originally in grass, shall we consider transplanting the grass and moving that kind of an agriculture eastward from its original western habitat? Can we hope for success unless the soils farther east are brought up in their fertility to the levels of those farther west, where grass was native? Shall we transplant the crop with no concern about how valuable it is as a livestock feed? Shall we oppose nature, and try to make grass grow where it doesn't want to grow?

Considered as a crop, grass is apt to be valued only for the mass it produces. For the cows that eat it, however, bulk production per acre is neither criterion nor enticement. Bulk alone doesn't make milk or fat. Some grasses will produce bulk on very poor soils, but if allowed

FARMERS got the notion, when the soil was new, that rotations kept it rich and productive. Some of them, like old dogs, won't learn new tricks about fertility.

to mature they might not even make seed. Grass is apt to be considered as a crop substitute when other crops like wheat, corn, (which are also grasses) and many more are declining in their delivery of seed because of declining supplies of soil fertility. It is on just such soils that grass may be big bulk, good cover, and excellent protection against erosion, but yet be poor animal feed.

Cows can't talk, and the only way they have of telling us how poor their grass or hay may be is by their low output of milk and by less gains, to say nothing of their increased susceptibility to disease. Grasses hold up better under grazing and recover more quickly after being cut back, if there is an adequate supply in the soil of phosphorus, nitrogen and potassium. It is young grass, maintaining its youthfulness in repeated growths, which is possible only by means of the fertility, that really is nutritious feed. Calcium, too, has so long been listed as essential for legumes that we have forgotten to say that it is required also for good grasses. Grasses will not put calcium into milk and bone unless the soil is properly stocked with lime to put it in the grasses.

Soil Treatments Must Provide Balanced Plant Nutrition

In the eastern United States we have limed many soils with a pure calcium limestone to bring them to the danger point of exaggerating the calcium over the magnesium. Under a grass cover which was protecting the soil from erosion, and under a liming treatment with calcium carbonate to lessen the acidity, there can exist an imbalance of magnesium to bring on a deficiency of this neglected element. This deficiency is more rapidly shown in other crops than by grass. Grass may merely keep hidden its hunger for this and other nutrients, but will pass its own undernourishment on to the animals.

How important magnesium is to animal well-doing is shown by its close connection with the protein constituent, tryptophane, in the forage. Like some of the trace elements, magnesium put on the soil as a fertilizer increases the concentration in the forages of this required amino acid, which is so commonly the protein deficiency in corn. Magnesium and the trace elements used as soil treatments improve the feed value by increasing those amino acids, or the missing parts of the protein for which we must purchase supplements when feeding corn, for example.

This suggests that it is the deficient soil fertility, more than the particular crop being fed, that calls for imported protein supplements. Shall we not believe, then, that on these deficient soils, even a grass agriculture will be no escape from the problem of required, imported protein supplements? Can we escape the necessity to treat the soil with these fertility elements we have neglected to use, but which are required if our crops are to give us the "complete" proteins REQUIRING NO SUPPLEMENTS? If other crops failed to make good protein feeds for us on this poor soil foundation, then the introduction merely of what is called "a grass agriculture" to the same deficient soil fertility will again pass the deficiencies to the animals. Poorly balanced animal nutrition goes back to poor plant nutrition from poor soils.

Sanborn Field Testifies for Grass

Now how do the plots at Sanborn Field tell us that profitable grass farming and fertility are tied up together?

As early as 1888 Prof. J. J. Sanborn began to ask questions about grass, especially about its place in a six year rotation (corn, oats, wheat, clover, timothy and timothy), which was an accepted rotation practice among good farmers at that time. Prof. Sanborn may have believed that rotations themselves were more damaging to soils than straight cropping. The 66 years since have proved his point. The Sanborn plots at the Missouri Agricultural Experiment Station are now under recorded cropping systems as grass agriculture was among the several cropping and soil management schemes in the original design of this old experiment field. The theory to be proved was that in any cropping arrangement, or even any agricultural program, the fertility of the soil is the primary factor to consider; all else is secondary.

The six-year rotation has been regularly continued as Prof. Sanborn started it in 1888. Here the land was left unplowed half of the time in this extended rotation, so that it was in legume and sod grass crops for half of the sixty-three years of the experiment field's history. Now after more than ten cycles of that rotation, there are three plots with different soil treatments which today tell the story of what has happened to the soil. They tell us that it is not the rotation scheme; that it is not the choice of crops in it; but that it is the fertility of the soil under any crops that determines what kind of an agriculture in terms of animal feed values we shall have after six decades of farming according to this particular "system" of cropping, which *emphasizes the system but neglects the soil that must maintain it.*

With three plots handled uniformly in all respects except for the different soil treatments, this field has on exhibit now the herbage differences that help to show us the soil requirements for a lasting grass agriculture. On Plot No. 1, where there were no soil treatments and this rotation of corn, oats, wheat, clover, timothy and timothy was the regular cropping order,

MILLIONS of horses, which once enriched American soils with their manure, have gone into dog meat and Chicago hamburger. Fertilizer must take the place of the minerals once supplied by animal manure.

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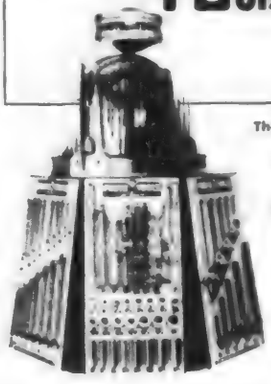

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the failures of the clover crop came in long ago. Even timothy failures came too, but after the clover crops had dropped out. Seeding lespedeza along with, and as substitute for, the red clover in cases of its possible failure brought good bulk production of this immigrant legume from Korea (Lespedeza striata). This crop now "keeps company" with broom sedge (Andropogan Virginicus) on this plot, which was given no soil treatment at all.

Broom sedge, that trademark of worn-out soils, has moved westward from the coastal plains, as we have exploited the soil fertility. Cows leave it strictly alone. So we plant lespedeza in our worn out pastures: cows will eat some of this, but can the feed value of the lespedeza be much higher than that of broom sedge, which we call a weed? May the lespedeza not be the lesser of two evils in the cow's judgment, and she takes to it as the last resort? Shall we not judge this legume by the company it keeps? Lespedeza is a legume, and it does give good soil cover throughout the three years of the six in the rotation, but is its nutrition for the cow any better than the broom sedge which it is substituted for? So Plot No. 1 tells us that unless the soil is treated properly with fertilizer, no rotation on earth will save it.

Now take Plot No. 2. In this same six-year rotation where a light application of barnyard manure was used, equivalent to three tons and less per acre annually, the taking over by the broom sedge has been delayed and is not yet so nearly complete. Tickle grass (Aristida dichotoma) is in dominance. Some scattered plants of broom sedge are there. Lespedeza seeded as corn substitute for clover has not yet taken over this soil so decidedly depleted of its fertility as on Plot No. 1, which was given no soil treatment.

One might be inclined to believe that less seed of broom sedge was carried in to Plot No. 2 by the wind were not the border strips of this plot well covered with broom sedge. A farmer often blames neighbors to the windward for the broom sedge on his own farm. We are slow to see that what a field offers as food for plants determines what weeds come to eat at its table. And the soil in a field determines the livestock nutritional values of the crops grown on the field.

Now let's have a look at Plot No. 3, which adjoins No. 1 and No. 2. This plot, with identical soil and cropping, HAD FULL SOIL TREATMENT. This plot, as the only one still in good grass, is simply telling us that the soil fertility and not the cropping combination is the controlling factor of any successful farming system.

Instead of a clover failure during the year when this legume crop comes around in the rotation, there is a nice clean crop of this admirable legume feed on this plot of well treated soil. The timothy comes in nicely following the clover. This grass, too, gives good yields and good feed quality in its hay crop. During the favorable season of 1951, for example, which was the sixth or last year in the rotation, this treated plot gave three cuttings of clean hay. There were no signs of what is commonly said to be a case of "the crop running out." More significant still was the fact that the clover suffers no cold weather hazard and doesn't "freeze out." The timothy is still green with the first snow of the early winter and is already green with the last snow of late winter.

After the third cutting of hay, a fourth crop for winter cover came along fast. A sampling taken as late as December 3 amounted to a ton and three quarters of dry matter. This adds to the six tons and more that had already been made into hay earlier in the season. There was pure timothy of high quality on this plot, as shown in Table I. While the seeding of red clover, lespedeza and timothy had been made alike on all plots three years previously (1948) this plot was now pure timothy. Where light applications of manure (Plot No. 2) were made tickle grass made up 80 per cent of the herbage with almost no lespedeza. But where no soil treatments had been used (Plot No. 1) lespedeza made up 50 per cent and broom sedge 44 per cent of the cover going into the winter. Lespedeza and broom sedge apparently are cover for soils of the lowest of fertility and would scarcely be much temptation to a cow even if lespedeza is a legume.

The Lesson Applied

Fields abandoned to broom sedge and

Percentages of Grasses and Legumes in the Plants Surviving at the End of a Six-Year Rotation and Hay Yields of the Final Year under Various Soil Treatments

Soil Treatment	Species of plants and weights on each soil treatment as dry matter—December 3, 1951					Hay Yields 1951	
	Broom Sedge %	*Tickle Grass* %	*Lespedeza* %	*Timothy* %	*Total Weight per acre*	*Number of Cuttings*	*Pounds per Acre*
None	44	2	50	4	2700	1	420
Manure Light application	15	80	2	3	4000	1	1960
Full Soil Treatment	..	1	..	99	3540	3	5390 3920 2940
							12,250

poverty grass, similar to what we see on Plot No. 1, are all too common on American farms. What can be done to get them back on their feet where they can pasture a cow from March to November, or give three good cuttings of hay? The procedure is the reverse to that which brought in the broom sedge: Bring back the lost fertility.

If you have such a field, call your county agent. He will test your soil and will report the organic matter for nitrogen, the calcium, the magnesium, the phosphorus, and the potassium, and how much is available to feed a crop of grass. Starting from this, you have a specific guide, rather than just a guess, for the soil treatments you will need. Test-guided treatments were used on Plot No. 3, to bring this up to excellent timothy, though it was by no means as low in fertility, then, as Plot No. 1 is now.

The soil under the broom sedge now has a pH of 4.7; that under the treated soil and the good grass, is 6.5. An application of 2-2½ tons of agricultural limestone, particularly dolomitic stone, suggested by test for this silt loam, brought the degree of calcium and magnesium up to where these elements were delivered in ample supplies to the crop. The calcium also served to release the other nutrient elements into the plant roots more efficiently.

The phosphorus was brought up by means of 1000 pounds of rock phosphate plowed down earlier in the rotation, but it was supplemented by some in the soluble form when 600 pounds of a 10-10-10 fertilizer were put on for the help of the potassium and the nitrogen. This mixed fertilizer was a top dressing on the grass, and brought immediate response from the timothy. After each cutting a hundred pounds of ammonium nitrate was put on to speed up regrowth.

In order to keep this timothy going, and delivering good quality as animal feed, it would be well to use 200 pounds or more of 10-10-10 per acre early in the spring as a means of holding the soil's supply of phosphorus and potassium up to the level indicated by the periodic soil tests. The calcium and magnesium would likewise be kept up, according to the same guide, by periodic use of dolomitic limestone. The extra nitrogen needed for better protein than starving grasses can supply would be obtained through applications of ammonium nitrate or other nitrogen carrier in amounts determined by crop yields and plant appearances or symptoms.

Of course, the plants should not be grazed back to soil level. They should have opportunity, before the season is too far gone, to grow tops which supply reserve nutrients for the roots for early spring growth. That is why grazing must be guarded in the late season. Then for the early spring help the 10-10-10 fertilizer may go on in later winter.

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In a going grass agriculture the earlier grazing depends, first, on what is stored in the roots as carry-over from generous supplies of fertility taken up in the fall, and second, on the extra, readily usable nitrogen offered the plant in late winter or early spring. Under careful attention

ROTATIONS are no substitute for fertility.

to the soil in relation to nourishing the grass, this crop can come through the cold winter without starvation, a condition blamed too often on the weather rather than on the failing soil fertility. Going from broom sedge to grass is the simple reverse of going from grass to broom sedge, only we can bring it about in a much shorter time by sensibly supplying nourishment for the grass.

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These plots tell exactly this story, namely, that we can't expect plants to grow unless the soil nourishes them.

The Roundup

On the plot with full treatment according to soil test there is a grass agriculture coming back quickly with more grass every time it is cut. This will provide an extended grazing season of the same grasses and legumes within the same field, indicating there is no need for a pasture system of several kinds of grasses, in different fields, calling for us to juggle the cow from one to the other to keep her going. Here also is a system that is giving good soil cover as a by-product. It is giving an extended grazing season from snow to snow. But more than all that, it is giving a quality of feed that is nutritional rather than just filling, and it doesn't fool the cow, because she has a full belly, into believing she is well fed. It is a grass agriculture not dependent

THESE GRASS STRIPS are fertilized heavily.

on a system, but on the only firm foundation that can give real values to any system, which is fertile soil. It is a grass agriculture to give earlier grazing in the spring, later grazing in the autumn, and better grazing at any time because it is established on soils made better by proper fertility treatments.

THE AUTHOR: Dr. William A. Albrecht, one of the foremost authorities on soils, is professor of soils and chairman of the department of soils at the University of Missouri College of Agriculture. He was born on a farm in central Illinois, and educated in his native state. His studies in soils have dealt with the functional viewpoint or the soil's service in nourishing microbes, plants, animals and all life. He is the author of many scientific and popular articles on soils and soil fertility. With unremitting zeal, his contributions emphasize the fundamental necessity of feeding plants, animals and humankind through ministrations to the soil itself, correcting the deficiencies of diet at their point of origin in soils that have been assayed and found wanting.

DUCKS READY FOR MARKET IN NINE WEEKS

(Continued from page 41)

controlled by a serum that is being developed.

Duck disease can be kept down by selecting strong, vigorous strains of ducks. The houses should be cleaned and spray-disinfected before a new batch of ducklings are placed in it. The litter, straw, chips or ground cobs should be kept dry by using lime and adding new litter. Deep litter methods will work and the floor litter can be allowed to build up to a foot or 18 inches thick if it is kept dry with lime. Watering equipment should be cleaned out daily with a chlorine solution.

If you find a sick duck, isolate him immediately and get in touch with your extension poultry expert or veterinarian if you can't diagnose the illness. If you have a number of sick ducks be especially careful not to carry the germs to the healthy ones with the droppings on your feet. Sick ducks should have all of their equipment cleaned and disinfected daily, and their littre kept very clean and dry.

Says Chester B. Franz of St. Louis, one of the country's largest poultry buyers and

FAST-GROWN DUCKS will dress out with firm, white meat and weigh over 3 pounds.

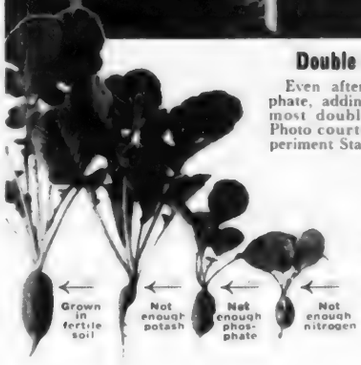
distributors: "The market will accept high quality white-meat ducks produced on a high-speed program. And poultry buyers are just as firm in refusing ducks that are over 15 weeks old as they ever were, for the birds at that age have become stringy and tough. We brought a truck load of high quality, quick-raised ducks into our plant one Thursday in the winter. By Monday the dealers that had bought them were calling back to re-order. We couldn't get another truck load soon enough. That's one reason we are thinking of putting in a complete farm operation ourselves, so we can get several truckloads of frozen ducks every week. Year round production could be maintained because they could be frozen during periods of light demand. I wouldn't advise any farmer to put in a small flock of ducks any more than I would advise him to go into the broiler business on a small scale. We are not interested in market-run flocks of 50 to 100 ducks. Take the problem of cleaning them. The good operator can pay for the cleaning operation with the duck feathers he sells. But if you try to clean ducks in a room where chickens have been cleaned and let just a few chicken feathers get in with the duck feathers you're stuck. The buyers of duck feathers will chop your price down until you can't pay for your cleaning. Ducks and chickens have to be cleaned in separate plants."

Franz feels there is a big future for the commercial duck raiser. He points out, "The duck business is just about where broilers were five years ago; people are discovering that it is a specialty business with an increasing demand."

Here's HOW to DOUBLE THE YIELD OF EVERY ACRE

Double the Yield of Corn

Even after using lime and phosphate, adding the needed potash almost doubled the yield of corn. Photo courtesy Wisconsin Ag. Experiment Station.



Soil tests will help your farm crops even more than in radish experiments at left. You will have greater size, earlier harvest and smooth high quality in root crops, also lush foliage and vigorous growth of leaf, fruit, vine and grain crops.

The Sudbury Soil Test Kit makes money and saves money. You increase crop yield by using enough fertilizer where needed. You stop throwing money away by avoiding the use of lime, nitrogen, phosphate or potash—where there's already enough in the soil.

You Can Get Results Like These

"I have proved to myself that no one can afford to be without a Sudbury Soil Test Kit if he has anything to do with soil or plants of any kind. After following the recommendations, my wheat yield per acre was greater than ever."—G. M. S.

"The test set is O.K. It is a valuable guide in my farming. I will use it again next year. My tomatoes and peppers did fine, and my corn reached about 11 feet high."—L. J. D.

"Tests proved one field to be planted to potatoes was deficient in potash. With this knowledge and applying 5-10-10 fertilizer, the result was to nearly double the usual yields, thus saving on fertilizer cost."—S. G. H.

OVER 300,000 NOW IN USE

Hardware, Seed, Grain and Farm Supply Stores: Serve your customers by carrying this essential aid to Better Farming. Write for Special Offer.

You can get more income out of your farm this year than ever before! There's still time to test your soil and add just the right fertilizer to get bigger crops yet this season. Crop experts say that side dressing crops like corn or tomatoes is better than just using fertilizer before planting.

Even dairymen have been amazed at the discoveries of soil scientists in the past few years showing phenomenal increases in both milk production and weight of beef by fertilizing pastures. By soil testing and fertilizing, farmers are increasing milk production up to 300%.

These Easy and Amazing Tests Mean Bigger Crops Right Now!

Take the guesswork out of farming and make all your crops more profitable by testing the soil so you know how much lime, nitrogen, phosphate, and potash each field needs. Wouldn't you like to have your land yield up to 200 bu. of corn per acre, 700 bu. of potatoes, 60 bu. of wheat, 100 bu. of oats, 5 tons of hay, 30 tons of tomatoes? Best of all, a Sudbury Soil Test Kit does more than just help produce record yields this year — it also actually helps build up the fertility of your soil for years to come, rather than drain its vitality.

Up to 500% Increase!

H.C.B. of Montpelier, Ohio writes he doubled his wheat crop, tripled his yield of corn and hay and boosted his oats 500%, simply by using his Sudbury Soil Test Kit. So many neighbors came to him for advice, he also went into the phosphate business, and tests soil for his customers. Thousands of farmers in every section are improving yields on all kinds of crops—yet at the same time learning how to save as much as $15 an acre on fertilizer the Sudbury way.

No Knowledge of Chemistry Needed

A 10-minute test tells you more about your soil than a lifetime of farming. Even your very first tests will be accurate and dependable, pointing the sure way to bumper crops.

Easy As Reading A Thermometer

Easy-to-understand directions included; you just read and compare colors! You'll get back up to $12 for every dollar you spend on fertilizer.

Farmers DeLuxe Soil Test Kit

Complete with everything for hundreds of tests. So simple anyone can use it. So reliable county agents, ag. colleges, extension workers and progressive farmers everywhere depend on it. Shows the right amounts of nitrogen, phosphate and potash for each field. Tells what formula to buy or how to add to present fertilizer to supply the additional plant foods needed—also tells whether lime is needed (pH) and how much. Chart shows needs for 225 different crops.

Lifetime welded steel chest with carrying handle—test right out in the field if you wish. Order now—you'll want to use it right away, and all year round, year after year. **Only $29.95.**

Soil Testing Boosts Tomato Yield

Plant 202 with the right fertilizer, had sturdy vines and heavy crop. Two plants at left needed nitrogen; plant at right had too much and went to vines and foliage instead of fruit.

FREE TRIAL!

MONEY-BACK GUARANTEE

SEND NO MONEY—Order your Sudbury Soil Test Kit today C.O.D. plus postage (or send check and we'll mail prepaid, saving you 18 lbs. postage; we'll also include valuable book FREE, "Our Land and Its Care").

Or, use our convenient Easy Payment Plan and pay mailman only $4.95 plus postage on delivery, then send 4 monthly payments of $6.75 each.

Try the Sudbury Soil Test Kit at our risk—test every field you wish. Then, if not delighted, return in 10 days for FULL refund.

SUDBURY LABORATORY
Box 155, South Sudbury, Mass.

Send me the Farmers De Luxe Soil Test Kit at low cash price of only $29.95 as checked below:

☐ Enclosed is $29.95. Ship prepaid. ☐ Send C.O.D. plus postage.

Name .....

R. D or St. .....

P.O. ..... Zone .. State .....

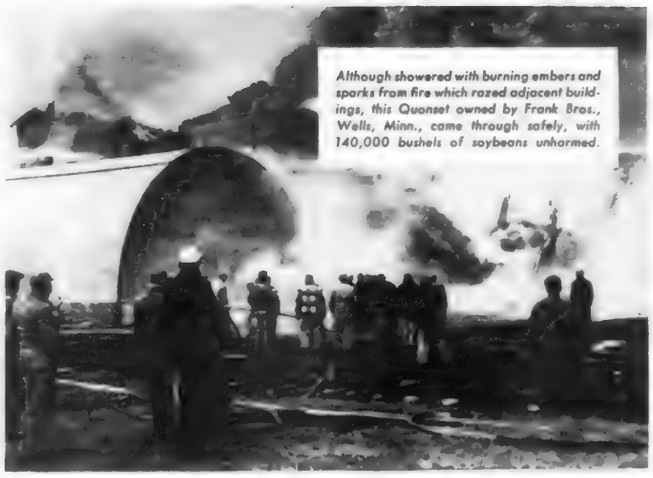
☐ I'll use your easy payment plan and pay postman $4.95 plus postage, on delivery—then send you four monthly payments of only $6.75 each.

YOUR Better Crops GUARANTEE

Use your Sudbury Soil Test Kit all season. If you don't get bigger crops, return it any time this year and we'll refund your money. You be the judge! We know you'll never part with your Soil Test Kit.

SUDBURY Soil Test Kits

Sudbury Laboratory, Box 155, South Sudbury, Mass.



Although showered with burning embers and sparks from fire which razed adjacent buildings, this Quonset owned by Frank Bros., Wells, Minn., came through safely, with 140,000 bushels of soybeans unharmed.

DURABLE, ALL-STEEL

QUONSETS®

-Protection for you!

Durability and strength is one excellent reason why Quonsets are the favorite production building on the farm and ranch today. To safeguard crops, livestock, or farm machinery, your best building buy is a Quonset . . . made only by Stran-Steel Division. See your authorized Quonset dealer or send the coupon.

An Alabama tornado did not harm this Quonset, top right, but nearby farm buildings suffered severely. Sturdy, durable Quonsets go up in days . . . and serve you for years.

You'll find Quonsets ideal as loose housing or stanchion barns, as shop or shelter buildings, poultry or hog houses, and for storing and curing grain. Mail the coupon.

I'm interested in the advantages of Quonsets for_____ type of farming. Send me details.

NAME_____

ROUTE AND POST OFFICE_____

COUNTY AND STATE_____

(Please Print) 28

GREAT LAKES STEEL CORPORATION

Stran-Steel Division • Ecorse, Detroit 29, Mich.

NATIONAL STEEL CORPORATION

MRS. BAINUM COOKS FOR THRESHERS

(Continued from page 57)

She'd drain off a part of the grease, pour in a little water, and cover the pan to steam the chicken so it wouldn't be so hard. She made the gravy in the same pan, too. A little flour was stirred in with the grease until it was brown—Mama never wanted any white gravy—and then whole milk was added. For a bunch of hands at threshing time you had to make aplenty because there aren't many men but like lots of gravy."

Threshing had it social side, too, but Mrs. Bainum denies that she cut a bigger piece of pie—when Mama wasn't watching—for the best looking bachelor. But she blushes as she denies it!

"In those days we wore just a common calico dress to work in—not our best calico, law no!—and a gingham apron, the tie-around kind. When we went outside we all wore our old slat sun bonnets. After we finished in the kitchen after dinner, Mama would say, 'Well now, let's put on our clean aprons and go out to the threshing machine. I want to see how the crop's turning out.'

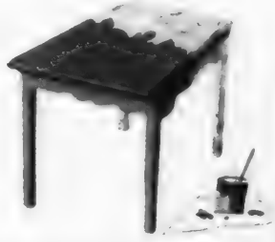
"Back when I was a girl the engine was pulled by horses. After a few years, though, steam engines came in and we always had to have coal on hand when we knew the thresher was coming. The most important men in the outfit, I guess, were the separator boss and the engineer. They saw that the separator was set just so and that all the belts stayed together, and that the old engine always kept a head of steam. Every boy in the county wanted to haul water for the engine. The water boy drove the tank wagon and filled it at the creek by a hand pump. What with one threshing dinner after another, he usually got fat and lazy before the season was over.

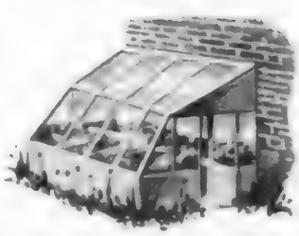
"We always had our team and wagon there at the thresher and as the sacks were filled we hauled them away to the granary. We didn't take the grain to market until the price got right, later," Mrs. Bainum says. "I used to help hold the sacks at the thresher. I've done nearly everything on a farm a man can do, I guess, except cradling the wheat. Working in the wheat I never minded because most of us raised the kind that didn't have beards, but how I hated working in that old beardy rye!"

There was only one accident during threshing time that Lillie Bainum can remember. "I guess you could call it an accident," she says. "The horses ran away with one of the wagons. When you set the engines back then, you know, you dug holes to put the wheels in. Then, when the engineer went to pull the engine out, it would give a big *Chug!* Well, that's what happened and the horses went lickety split with no one a hold of 'em. Down the hill they ran, across the creek, and into a rock fence. The fence is what stopped them. And the wagon wasn't damaged as much as you'd think.

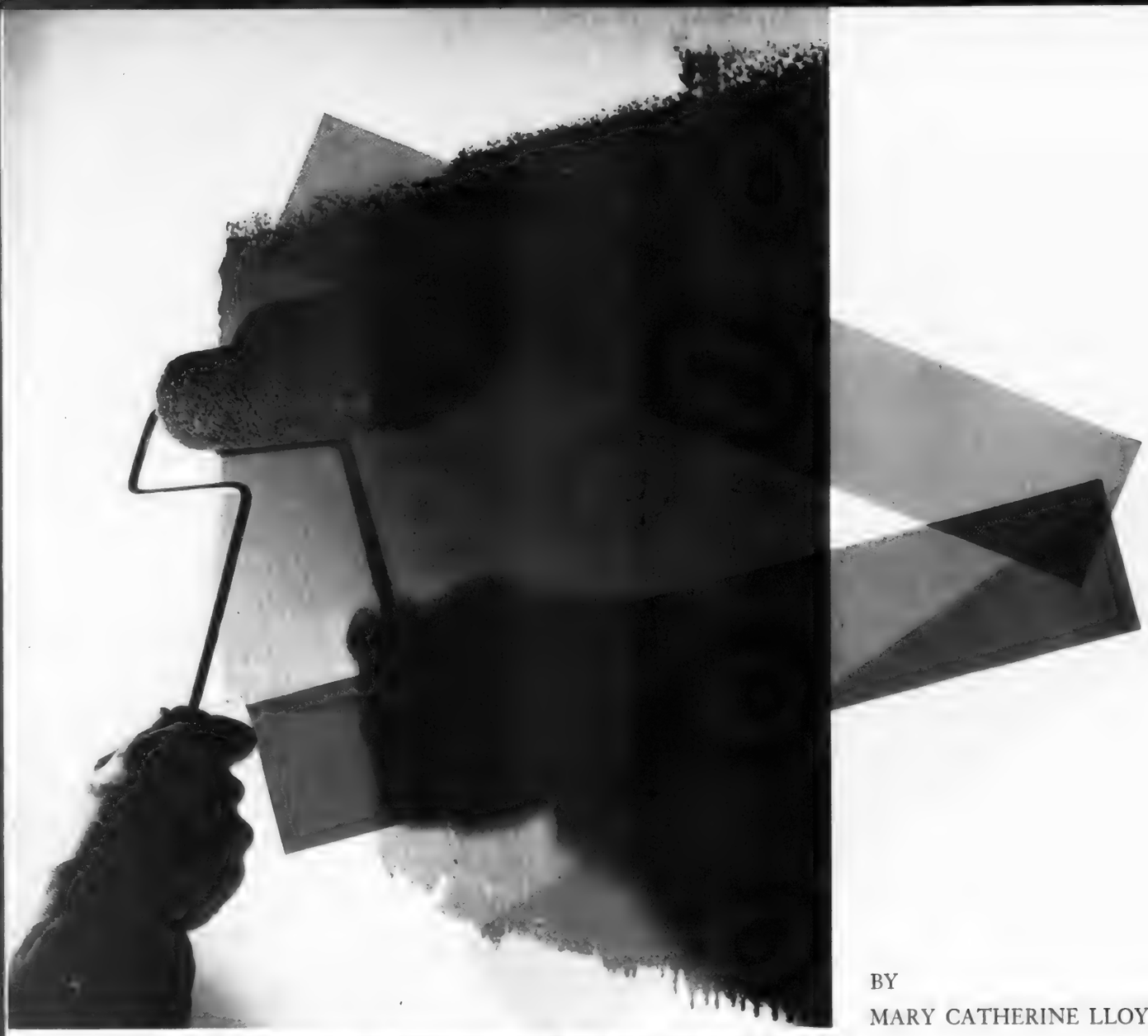
"Yes, threshing certainly has changed since I was a girl," Mrs. Bainum says sadly, "Now a combine does everything—only takes two or three men and mostly the women don't want to feed them. If there was anything we liked, it was to get off a big dinner for men working. We didn't want anyone to sit down to the table and act like the food wasn't there. We liked to see men really eat. Wonder why it is women in this day and time don't seem to take the interest that we did in cooking a big meal? Maybe it's because they don't have a wood stove that will bake a pan of biscuits like Mama used to make."

THE FARM HOME





12 *special paints.....*



BIG ROLLERS, little rollers, short whiskered ones and some with long wooly coats, there is a kind for each type of paint. Housewives who have never painted anything but a kitchen chair have found that this new tool makes room painting fast and easy. This is Glidden's rubber base paint, "Spred Satin," being applied.

BY
MARY CATHERINE LLOYD

GRANDFATHER had a simple way of telling how good a house paint was. He used to say, "Just tell me how much white lead it's got in it and I'll tell you how long it will last!" The function of paint in his day was to cover up the bare wood and protect it from the elements. Grandpa wouldn't recognize half of the ingredients that go into paints now.

Today there are a dozen new type paints doing special jobs around the home. Not only are the jobs they perform different, but the colors are a long jump from the tired, pastels that used to be standard on the color cards in hardware stores.

Even the paint brush has given way to a new quick way to apply paint—with a roller. The quick-drying feature of modern paints makes any day painting day. Furniture or floors can be painted in the morning and used in the afternoon. Walls and ceilings of the dining room can be roll-painted in half a day, and since the rubber-base emulsion paint has very little paint smell, it's no problem to eat in the room by evening.

The advantages of the new paints over old types are just what was needed on the farm. They give better and longer protection of wood and metal surfaces, so less time and money must be spent in painting. They spread easily and with good one-coat coverage, so the members of the farm family are able to do the painting themselves.

"Low Lustre" Paint

One brand new paint gives reasonable protection to new, unpainted, or old painted buildings with a thoroughly-covered new look in just one coat, while two coats provide remarkably long lasting protection. On the market for the first time this spring, it has been in test use for some years on 1,000 homes in the north, south, east and west. It might have been made just for the farm, the way it solves a lot of farm painting problems. It can be used for a uniform quality and matched color paint job on all the farm buildings from a concrete block barn to wooden dropsiding house. This paint is "Armstrong's Low Lustre" exterior finish. It goes on wood and metal, plywood, rough siding, wood shingles, wood shakes, concrete blocks, brick, asbestos cement shingles, fabricated siding and gutters, and does a good job on each of them.

The liquid or vehicle of this paint is of quality tung and linseed oils, but processed by a new super-heat treatment and carrying, in addition, phenolic resins—the same synthetic used in Bakelite plastics. In liquid form for paint, this resin contributes to the spreading quality and durability of this paint. Other ingredients new to paint that give this one enduring surface are mica and magnesium silicates. Tetracholorophenol, used to rot-proof

PAINTING plywood has always been a tough job. The grain raises and elbow-grease and sandpaper are the only cure. "Firzite" was developed as a first coat before painting or varnishing plywood. It makes a good filler and keeps the plywood grain from getting "wild" and rough.

DUPONT'S Duco "One Coat Magic" enamel lives up to its name. Even if the furniture to be painted can't be kept out of service for long this new enamel can be used. It dries hard in a day. The enamel dries to a glossy, protective coat that stands hard wear in a kitchen or on a porch.

TWELVE SPECIAL PAINTS

to make farm living easier

wood, renders the painted surfaces fungus and mildew-proof.

For such tough jobs of wood preservation as is needed for greenhouses and cold frame covers, these ingredients keep the moisture out and add to the life expectancy.

The farmer is going to appreciate these technical improvements that make this a paint that doesn't crack, blister or wrinkle. But it's his wife who'll be quick to see the advantage of this paint's twelve modern colors (and by "modern" we mean colors that are bright and solid as contrasted to the old wish-washy pre-mixed paint colors.) It is possible to make sixty intermix colors, giving almost any hue, by mixing a definite amount of the regular pre-mixed colors.

A New Way to Pick Colors

Mrs. Arthur Watts of Southpoint, Ga., was one of the farm wives who got a pleasant surprise when she went to her paint dealer this spring. Says Mrs. Watts, "I never could tell from the little dab on the card what color the paint that I put on the room was going to be. When my dealer handed me a big folder of paint sample cards showing dry colors—each one as big as a bread board—and told me to take them home and see what color matched furniture and curtains, I couldn't help saying, 'It's about time.' "

Eagle-Picher has developed this try-it-out-at-home service for their new interior wall paint, a washable quality, oil base type. Eagle Picher's "Pre-harmonized Wall Paint" comes in 18 standard colors with numerous intermixes. There are twenty-two of these colors available in different kinds of paint: flat for walls, semi-gloss

TO REPLACE the dull finishes that used to be standard for radiators, stoves and boilers, Sapolin has brought out "Radiator and Range Enamel." It comes in six bright colors and will stand heat up to 500 degrees. Boiling grease or hot foods and will not mar or discolor it.

SUPER KEM-TONE is a washable new paint that drys in an hour. To get full benefit of its washable feature (with paint cleaners) it should be allowed to dry for three to four weeks. It can be applied over plaster, woodwork or even wallpaper. It comes in 16 modern colors.

WATER TANKS and pipes are often damp. That means they need paint protection, but paint won't stick to wet metal. A new aluminum paint, "Permite No. 1600", can be applied over wet surfaces. The tank in the picture below was wet with condensation yet this paint went on perfectly.

and high gloss for matched walls and woodwork. And, like other new paints, these go on easily by brush, roller or spray.

The Rubber Paints

Sherwin Williams' "Super Kem-Tone" is an interior paint containing a rubber base that dries to touch within the hour, and cures in a few weeks to tough durability. The velvety finish of its sixteen light and dark colors, or many intermixes, is guaranteed after four weeks curing to withstand such brisk scrubbing as necessary to clean off even crayon. Almost any wall, papered or new plaster, or even rough brick, is covered in one coat by the roller method.

Among the new rubberized paints there are many especially useful on the farm. "Spred-Satin", a 100% latex base paint, made by Glidden, is adaptable for any room in the farmouse because it can be scoured as readily as the sink. It is so tough that a lye solution poured on it leaves the finish unmarred.

Another scrubbable interior wall paint is Pittsburg's "Wallhide Rubberized". Its elastic surface won't chip, crack or scuff. It fairly glides on and dries in fifteen minutes to a smooth finish, neither dull nor shiny, nor showing any brush or roller overlapping marks. If used with a roller, one coat usually covers practically any surface. If necessary, a second coat can be put on four hours after the first.

If a metal paint is needed where there is constant dampness, "Permite Aluminum No. 1600" offers protection for wood, metal or masonry. Where there is constant condensation on walls and equipment, as in greenhouses and dairies, Permite can be painted right over the damp surfaces, yet it adheres perfectly, the trapped moisture is "breathed" out and the surface beneath the paint is protected from further moisture invasion.

A Concrete Paint That Sticks

"I want a paint that I can use on the concrete of our front porch," an Indiana housewife wrote to a paint company. "You see we have a walnut tree that drops its stems and leaves on the porch and walk, and the stain they leave is just like that from tobacco juice. No one in my family chews tobacco and that's the reason we don't want the porch looking that way."

For concrete floors and steps in outbuildings and farm homes, the rubber floor coatings are ideal. "Paratex", made by Truscon is an alkali-proof, rubber base floor paint that really hangs onto concrete and is highly resistant to sun, dampness, heat or cold. Put it on concrete floors, indoors or out. "Para Stonetex", the same maker's rubber base outside masonry wall coating has equally good covering and weather-defiant properties. Both hold down repair and replacement costs on farms.

For Dry Basement Walls

Above-ground masonry walls, blocks, brick or stucco, as well as below-ground walls absorb a tremendous lot of water during rains. When the water freezes within the walls it cracks them, or it may render the building or cellar almost too damp for use. In new construction, dry Fluresit can be incorporated in concrete to make a wall water impervious. But for old, outside masonry walls of any type aboveground, or inside belowground walls where water seepage has proved difficult, the farmer now may use a concrete paint containing Fluresit. It is "Dampchex", made by American Fluresit Company. Put it on in two coats, with the first coat actually scrubbed in rather than brushed on, using a special masonry brush for complete water-turning on the outside or to stop seepage on the inside. Dampchex comes in colors and two grays.

For bad cracks use Fluresit's "Quickset Leakstopper" for filling in before painting with "Dampchex".

EAGLE PITCHER'S big "color chips" can be borrowed from dealers to try out at home. They are paint samples big enough to show how the 18 cheerful colors will look with furniture and curtains. These colors come in three kinds of quality oil base paints.

Range Enamel

Since time is often at a premium on the farm, paints that can do a specialized job in between mealtimes are a boon to farm homemakers. Take "Sapolin R & R", radiator and range enamel, for instance. Drying hard in five hours, this enamel can be put on the kitchen stove between dinner and supper time. It withstands the heat of the stove and grease (up to 500 degree F.). Another enamel that goes on fast, covers solidly and dries rapidly to a beautiful finish that will last for years is DuPont's Duco "One Coat Magic" Enamel. It's an ideal paint for kitchens, bathrooms and furiture. Porch chairs painted in the morning, on a good drying day, can be used that evening. DuPont's new "Sealer-Coater" is another time saver; it's used as a first coat and it dries in as little time as 20 minutes, ready for the finish coat. It's unique for fast priming.

Where the farm wife wants a clear coat on natural wood floors, woodwork or furniture, there's "Fabuloy", a synthetic resin finish made by Pierce and Stevens. It dries dust-free in just one hour, and is fully hard in sixteen. It's flexible, non-yellowing finish resists spotting from water, grease, acids or ink and wears long and well.

Taming Wild Grained Wood

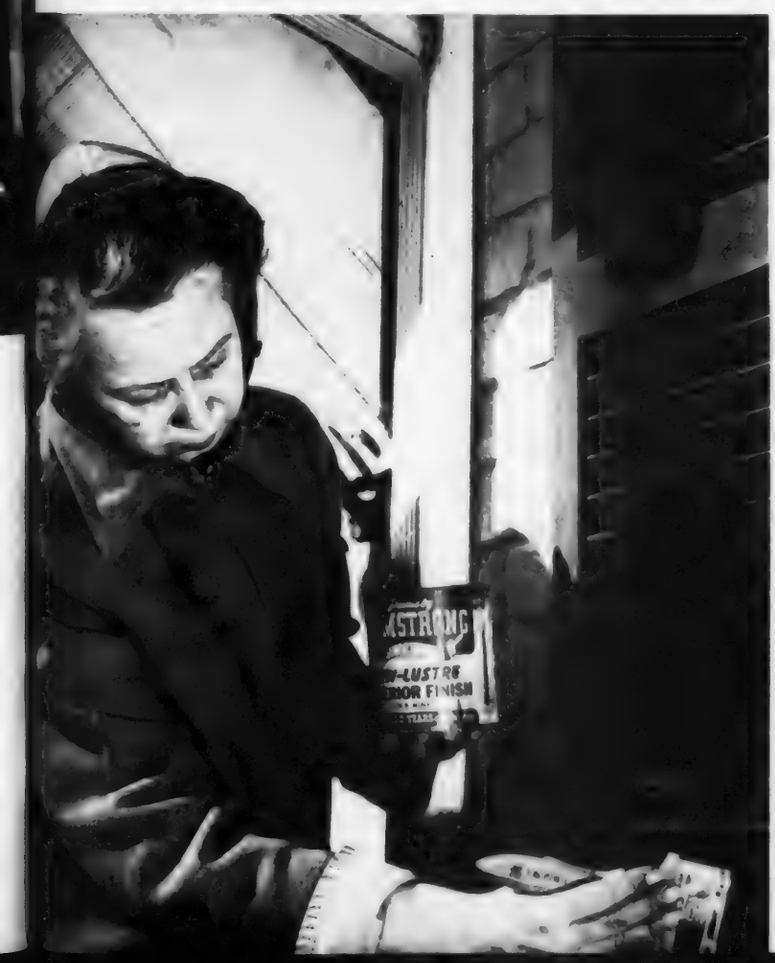
If there's the problem of rough or wild grained wood, typical of fir plywood, the new "Firzite" will tame it. "Clear Firzite" is an ideal sealer to use under stain finish-

(Continued on page 96)

"GLASS FROSTING" paint lets in the light but insures privacy. It can be used on bathroom windows or to block out an unsightly view. Soap and water do not wash off its ground glass effect. It can be used wherever diffused light is wanted.

TRUSCON'S "PARATEX" rubber base floor coating can be used either inside or outside on concrete. It resists alkali, chemicals, gasoline and soaps. Its wearing quality makes it a good basement or milkhouse paint. It is available in several colors.

"LOW-LUSTRE" exterior finish made by Armstrong can be used to paint any wood or metal. It is one of the new "breather" type house paints that allows moisture to escape from wood without causing the paint to crack when the hot sun hits it.



"FABULOY" is a new synthetic resin finish that can be used in place of varnish on any wood surface that takes heavy wear, like that given by the two bystanders, above. This floor was dry enough to walk on in 3 hours, and dried hard in 12 hours.

IN 30 YEARS of married life she has worn a deep path from the well to the house, carrying 1200 tons of water, pail by pail.

RUNNING . . . HOT AND COLD

Farm water systems and how to figure costs, needs and supply.

SOMETIMES a farm wife who has carried water from a well in the backyard all her married life turns, like the proverbial worm, on her husband and issues an ultimatum: "No new tractor for you this year, Joe Conway; this is the year we bring water into the house."

A farmer faced with this crisis sees the handwriting on the wall and knows he had better take the first step in installing a water system for his home. Besides, he's tired of pumping water for his stock. "While I'm at it," he says to himself, "I'll run water around the barn, too."

Every farmer who installs a water system faces a battery of problems and questions. How much water will I need for house and barns? What is my available supply? What kind of system shall I install? How much will it cost?

Amount of Water Needed

The amount of water Joe Conway needs depends on the size of his family, the number and kind of livestock he has, and the modern conveniences he'll install that use large amounts of water. It is a common mistake to underestimate the needs for running water. With an electric water system the demand may increase as much as five times the amount used when water was carried by hand. For example, an average for each member of the family, including kitchen, laundry, and bathroom purposes is about 40 gallons a day. Compare this with the 4 to 6 gallons used by

each person when water is pumped and carried by hand.

Other approximate daily water requirements which may be figured into overall needs are:

Each horse—10 gallons per day
Each producing cow without drinking cups—15 gallons per day
Each producing cow with drinking cups—30 gallons per day.
Each non-producing cow without drinking cups—12 gallons per day
Each non-producing cow with drinking cups—20 gallons per day.
Each hog—3 to 4 gallons per day
Each sheep—1½ to 2 gallons per day
Each 100 chickens, not cooped—4 gallons per day
Each 100 chickens, cooped and coop lighted—9 gallons per day
Average lawn sprinkler—120 gallons per hour
½-inch hose with nozzle—200 gallons per hour
¾-inch hose with nozzle—275-300 gallons per hour
Washing dairy barn and milk house floors and utensils—15 gallons per cow
Automatic washer (amount varies greatly depending on type machine)—30-50 gallons per load

Sources of Water

The first thing to do after estimating daily water requirements is to check your old source. Will it yield enough safe, pure water to meet your new demands and is it located so that the water will stay pure?

When Joe Conway's grandfather was farming, the country was thinly populated. There was little fear of contamination even in open streams. Today, with a greater population per square mile, water can carry typhoid, dysentery, and diarrhea germs, intestinal worms and similar diseases. It is advisable to have your water, whatever the source may be, tested by the state health department or the county health officers before developing it for use in your system.

Wells, cisterns, springs, and farm ponds with small clean drainage areas commonly supply farm water. Each available source must be checked to find the purest and most economical supply for your farmstead. Deep wells are usually the best water source if they yield enough, for they are protected from surface pollution.

Wells may be driven, bored, dug, or drilled. The driven well is made by screwing a well point onto the end of a short pipe and driving it into the ground, adding lengths until the right depth is reached. They are satisfactory where there is no rocky soil and where water will rise in the pipe to within 20-25 feet of the ground surface so that a shallow well pump may be used.

Earth augers are used to bore wells. These holes can be lined or cased with tile, or with iron or sheet metal pipe. Dug wells are usually made a few feet in diameter by loosening earth and rock and hoistening it to the surface. At least the upper ten feet of the well should be cased with tight masonry. The disadvantage of a dug well is that it is subject to pollution by ground water and seepage.

METAL SHOWER cabinets may be conveniently installed on a closed porch or in the basement as a clean-up spot for the man of the house when he comes in from work.

Drilled wells are commonly six or eight inches in diameter and drilled with special equipment which can penetrate rock formations. The holes are cased with iron well pipe and casing. They may go to several hundred feet and are used where shallower sources of water are not dependable. Recently a new technique has been introduced whereby a well of almost 100 feet is drilled, cased, piped, and pumped in less than two hours, a fraction of the time usually required. This is done by a packaged unit portable drilling rig which consists of a 4-wheel drive one-ton pickup truck, a special rig, and five-foot sections of lightweight plastic casing. The equipment can penetrate shale, slate, sandstone and limestone, but is not suitable for drilling through solid hard rock.

The type well to put in depends on earth formation and where water can be found. The state geologist's office at the state capital may be able to supply free information on water levels in the state. If the farmer wishes to have an individual survey made of his land he may hire a consultant geologist to do the job. The geologist charges approximately $75 a day for his services and does not guarantee that a water source will be found. In some states the state geologist's office can give the names of available and competent consultant geologists in the state.

Experience of neighbors and careful observations of their wells may help. Well drillers can often give accurate advice.

Hubert Farris of Cincinnati, Ohio, has

THE PLUMBER adjusts a typical shallow well pump installed in the basement. This is a compact unit with the motor and pump mounted on the pressure tank.

been drilling wells for 30 years—in Ohio since '35 and before that all through Kentucky.

"Areas differ, of course," Farris says, "but a driller usually knows where the proven territory is. Experience teaches him to judge where water may be by studying the contours of the land. Water will mostly follow the valleys. When I see land that has a lot of rises sloping off into little valleys with that kettle-bottom look, I know I'll very likely find water. And I've had pretty good luck. Not more than one out of 18 or 20 of my wells is a dry hole. A lot of people believe that water witching is the only way to get water, but it doesn't work for me. If I'm following water witches, my percentage drops and about one out of ten wells is dry.

"Few drillers I know will work on a water-guaranteed-or-no-pay basis. I contract by the foot with only one-half the contract price payable if I don't get water. I drill for $3.50 a foot, including casing, no matter how deep the well is. Some drillers will charge by the foot, extra for the pipe, and boost the price as the well gets deeper. Sand and gravel wells will cost $4.50 a foot because of the extra expense in handling the pipe for such wells and because a bronze screen to filter the water is usually necessary. When farm wells make a little sand, I can eliminate the screen because a big water flow won't be required. I perforate the lower part of the casing and this acts as a pretty good screen.

"I can and do advise people on the type pump to use, but the plumber usually contracts for the whole job these days, including pump and pressure system. The advantage I see in getting the driller's advice on pumps is that he knows the well and can select the pump needed to make the most of the water supply according to well depth and flow-per-minute, avoiding any error in pump installation."

A simple fact, sometimes overlooked, is that no pump can get water out of a well faster than it flows in. A pumping test is advised to figure the flow of the well and the capacity of the pump to use. If the test shows that the well's capacity is inadequate to supply the daily needs, then the present well must be enlarged, a new well must be drilled or dug, or a larger storage tank used.

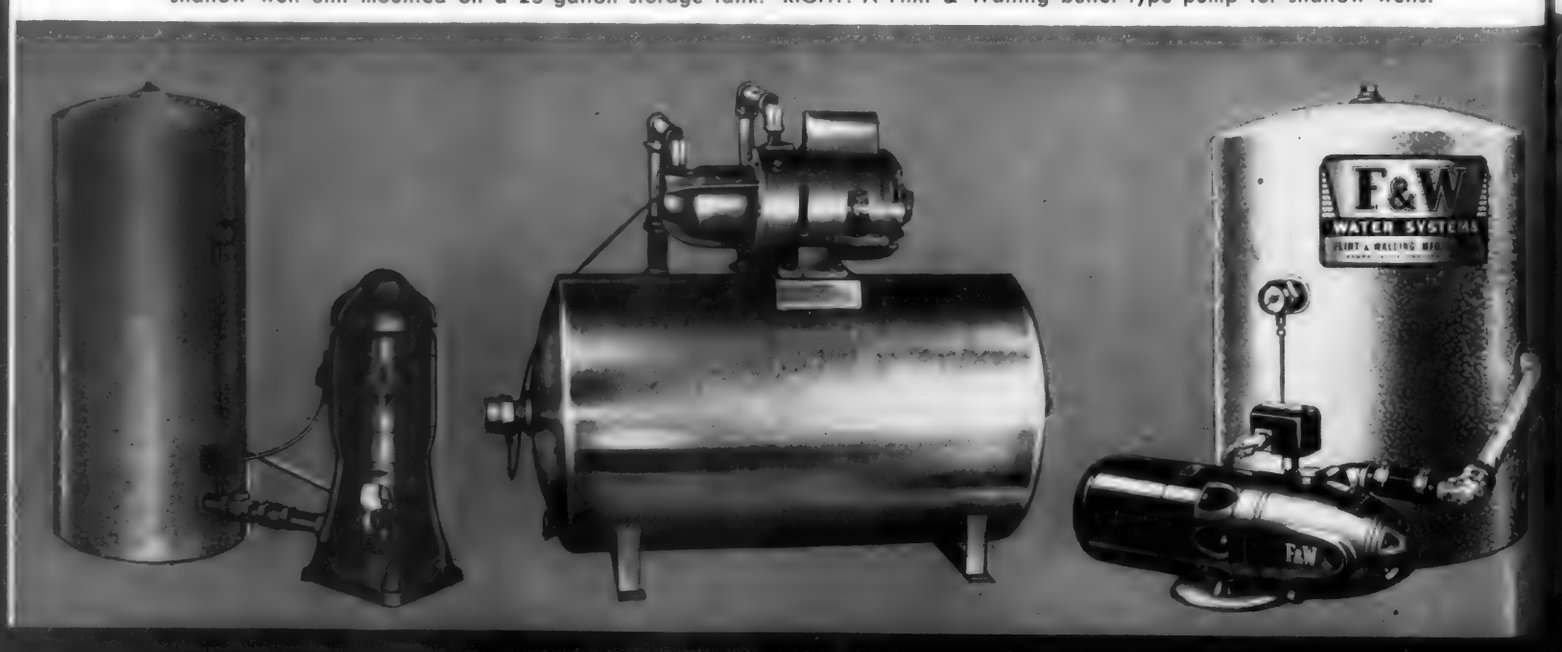
THE COMING of running water to a farm is a great day for the housewife—laundry, cooking, bathing, cleaning, will now be easier. But the farmer rejoices too, for he will pump no more water for his stock and his insurance rate will drop.

Spring water is similar in quality to well water except that it is less likely to be pure. Since springs are fed from ground layers near the surface, the chances of contamination are greater. Water from springs in sandstone, gravel, or sand formations is apt to be of better quality than that passing through limestone rock crevices because the sand is a better filter.

All springs are affected by rainfall, but a spring that increases in flow and becomes muddy after a small rain is probably being fed from a shallow source and surface water is entering it. The flow of a spring should be checked during late summer or after a long drouth. If it supplies less water than is needed for the entire farm, then it should be used to supply the barn alone, or if it is fine drinking water, the house.

Often the flow of a spring can be improved by cleaning it out. Building an enclosure of stone, brick, or concrete to

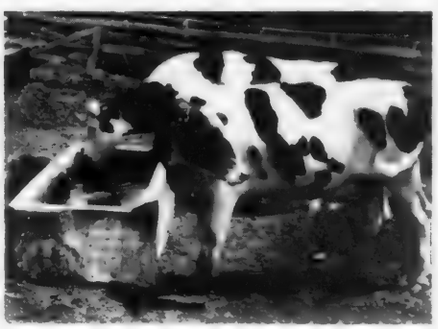
LEFT: The "Jacuzzi A," a turbine pump for deep wells; comes in a variety of h.p. ratings. CENTER: A Robbins & Myers shallow well unit mounted on a 25-gallon storage tank. RIGHT: A Flint & Walling bullet type pump for shallow wells.



keep out stock, dirt, and rubbish is advisable.

In many farm homes cisterns have been the main source of water when it was pumped and carried by hand. When water is supplied under pressure to the hot water system, kitchen, laundry, and bathroom, the old cistern is not equal to the task of supplying as much water as is needed. If more cisterns are to be built to supplement the first, the size will depend on the extra amount of water needed, size of the roof area available for catching water, and the average rainfall.

To determine the amount of water falling on a roof, measure horizontally in feet the ground plan of the roof and figure this area in square feet. Multiply the area in square feet by the rainfall in inches for the wet-weather period, which must supply the desired storage. Multiply this product by 0.625. The result is the approximate rainfall in gallons.



TURNING A SPIGOT is so much easier than pumping. A cow will drink 15 gals. a day.

The table, right, will help you figure the capacity in gallons of your circular tank or cistern.

To find the capacity of square or rectangular cisterns and tanks, multiply the inside length in feet by the width in feet. Then multiply this product by the height in feet. This result should be multiplied by 7½ to find the number of gallons the cistern will hold.

Depth (in feet)	Capacity in gallons when diameter (in feet) is—								
	4	5	6	7	8	9	10	11	12
4	376	588	846	1,152	1,504	1,904	2,350	2,844	3,384
5	470	735	1,058	1,439	1,880	2,385	2,938	3,555	4,230
6	564	881	1,269	1,727	2,256	2,855	3,525	4,265	5,076
7	658	1,028	1,481	2,015	2,632	3,331	4,113	4,976	5,922
8	752	1,175	1,692	2,303	3,008	3,807	4,700	5,687	6,768
9	846	1,322	1,904	2,591	3,384	4,283	5,288	6,398	7,614
10	940	1,469	2,115	2,879	3,760	4,759	5,875	7,109	8,460
11	1,034	1,616	2,327	3,167	4,123	5,235	6,463	7,820	9,306
12	1,128	1,763	2,537	3,455	4,512	5,711	7,050	8,531	10,152

To safely collect and store water, cistern designs should feature water tightness; close screening of inlet and overflow; a good cut-off to keep the first part of each rainfall out until the roof is washed; a clean filtering system; an overflow pipe to take water from the bottom of the cistern; and capacity to supply water during long dry spells.

A good filter properly installed and cleaned regularly will keep most of the dust, soot, leaves and insects out. A neglected filter becomes a source of contamination and is worse than no filter at all. Even with a good filter it is advised that the cistern be emptied and scrubbed once a year.

General types of filters in common use are the simple sheet metal filter attached to the side of the house and forming a part of the down spouting; an automatic roof wash device made of a tank or drum covered by a screened trough which catches the first water to come from the roof; and the sand-charcoal filters built on top of, or adjacent to, the cistern.

This type filter is made of fine sand, wood charcoal, and gravel. The sand filters out solid material, the charcoal removes color, taste, and odor, and the gravel prevents the loss of sand and charcoal. The sand bed should be about 2 feet thick, the charcoal and gravel about 6 inches each. As the surface sand becomes clogged, half an inch should be scraped off and replaced by clean sand.

Thousands of good ponds are built on our farms primarily as a supply for stock water and for recreation; and research is underway on the use of pond water in the home for all purposes except drinking. The soil conservation representatives in your county will help you with plans for a pond if it is to be used for stock water and other direct farm needs, not for recreation alone. These men emphasize that the land be properly surveyed and the pond built according to the survey results even if the cost is slightly more than the farmer figured on spending.

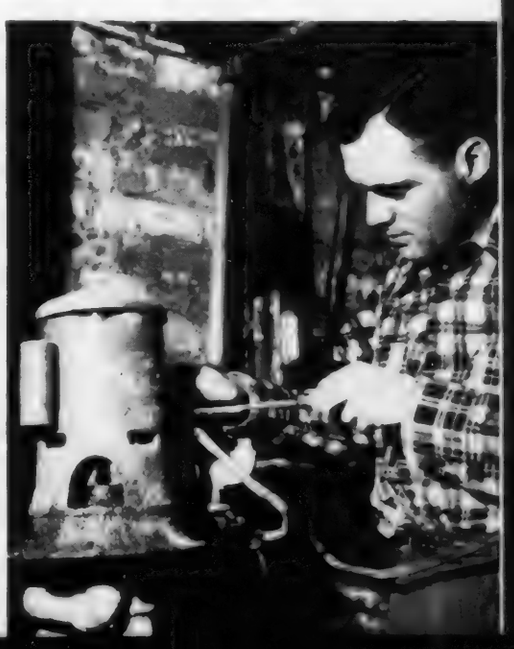
Ponds should be fenced to keep livestock out. A pipe to a tank or trough below the pond is the best method of supplying stock with water. A float and cutoff valve at the tank will keep the tank full with little attention. If located near enough to the farm buildings, the water can be piped to the barn and milkhouse and be of use as fire protection.

What System to Install

In choosing equipment to install in his system, the farmer usually relies on the salesman of the equipment he buys, the well-driller who puts in a well for him,

(Continued on page 119)

LEFT: A Myers deep well pump with a 42-gallon tank. Air is regulated by automatic control. CENTER: A Burks pump, made by the Decatur Pump Co., is a shallow well type. RIGHT: A deep well pump in use on an Indiana farm for 20 years, and still going strong.



ANTHRAX RAIDS MIDWEST HERDS

A recent off-season outbreak of anthrax has the health authorities of 17 scattered states worried and has quarantined scores of dairy and hog farms. The fact that the disease occurred in the cold spring months (late summer and early fall is the usual period for anthrax outbreaks) has even caused some commentators to speculate that this might be an opening attack of germ warfare launched by the Russians. This theory was dropped when the origin of the current outbreak was traced to anthrax-contaminated bone meal imported from Belgium.

Anthrax is a spore-borne disease which is usually spread by animals eating contaminated material. All warm-blooded animals, including man, are susceptible to it as are frogs and toads. Even angle worms can carry the disease. Death rates resulting from anthrax have always been high. When the disease is present in an area, dairymen should watch for the following pattern of symptoms:

General excitement with rapid heart action, followed by colic, high temperature, chills; loss of appetite; depression; weakness of muscles; and swelling of the flank, neck and chest. The body temperature may reach 107°F., and the animal stops chewing its cud. Pregnant cows may abort and milking cows drop off in milk production. After about 18 hours, the animals give off bloody discharges from all of the natural openings of the body. Just before death, the temperature falls below normal and breathing becomes extremely

labored. The mucous membranes turn a dark blue in color. These symptoms are true of the acute form of the disease. There are other forms, however, where the first sign of anthrax is sudden staggering, collapse and death. There is also a chronic form of the disease in which the symptoms are the formation of carbuncles on the skin and the deposit of liquids in the skin and mucous membranes. When the disease strikes, a farm should be quarantined immediately. Sick animals should be isolated.

Veterinarians are using penicillin and other antibiotics in an effort to cure anthrax. There have been a number of recent cases in which humans have been cured of the disease by this treatment.

Should the disease crop up, other animals in the herd can be given anti-anthrax serum, which is effective for 14 to 18 days. For more permanent immunization, there are four spore vaccines which are administered intradermally along with the protecting anti-anthrax serum. The vaccination, however, uses live spores and brings the disease onto the premises just as live virus hog cholera vaccination can bring the disease to the farm. For this reason vaccination is not being recommended in Ohio and in other states where anthrax is a rare affliction.

All other animals on the farm, such as cats and dogs, which might carry the disease, should be kept indoors or on leashes to prevent their carrying the disease onto the farm. A campaign against rats and mice should be started since they can carry the disease into the grain bins and haylofts and thus spread it to the other animals.

Dead animals should be burned on the spot and buried. If they must be moved, they should be moved on a stone boat or other conveyance to keep from dragging them and thus spreading the disease. Burial should be at least six feet deep since earthworms will carry the disease to the surface if the grave is shallow, and should be in a place where ground-water seepage will not be contaminated. Lime should be spread over the place of burial.

Where affected animals have been completely isolated, health authorities have permitted milk and eggs to be shipped from the quarantined farm. In cases where such isolation cannot be maintained, the quarantine is complete.

In Ohio, the Central Ohio Milk Producers' Cooperative has established the policy of paying the quarantined dairyman for the milk check that has been lost to him because of the disease. This has been done by levying an assessment against the other producers who are fortunate enough to have escaped. By following this policy it is hoped that the disease will be reported promptly and that dairymen will submit to a quarantine, which is our best method of preventing its spread.

At the present time, anthrax is reported in Iowa, Minnesota, Nebraska, North Dakota, Missouri, Illinois, Indiana, Ohio, New Jersey, Michigan, California, Texas, Georgia, Wisconsin, New York, Louisiana and Kentucky. The Ohio outbreak has been definitely traced to a shipment of 100 tons of bone meal from Belgium. It is probable that the other outbreaks can be traced to similar shipments of bone meal or tankage.

The disease is present in Italy, France, Belgium, Poland, Pakistan, India and Argentina. Disease control laws of the United States require that bone meal be heated to 165°F. This will kill rinderpest and similar diseases, but anthrax requires 212°F. for ten minutes before it is destroyed. At the present time action is being taken to change our import laws to give us greater protection.

WANT A BUFFALOBURGER?

(Continued from page 51)

up to education and experience. Jake gave his buffaloes a delightful transcontinental tour without mishap, but he was lucky. Last fall a carload of buffaloes were shipped to the International Livestock Exhibition at Chicago. Shipment was made by rail in a specially reinforced livestock car and the animals were held in reinforced pens while on exhibition. The preferred manner for shipping individual specimens is in crates. If a buffalo really gets it into his head that he doesn't want to stay put, no ordinary cattle conveyance is going to hold him.

The following spring the Kohberger herd numbered nine head. One cow proved barren, another died while calving; but the remaining four dropped good healthy calves. At this point Jake thought he'd try a cross breeding experiment.

"I put a little Guernsey bull in with the cows," he says, "but they ganged up on him and nearly killed him." This ended the experiment.

The obvious next step was to get a buffalo bull. He bought Johnny (all Jake's bulls are named Johnny) from the Allentown, Pennsylvania, herd, a herd established in 1911 by Gen. Harry C. Trexler, which by the terms of his will passed to the people of Lehigh County upon his death in 1933.

Johnny got along better than the Guernsey bull in that he was at least accepted as a social equal by the cows, but that was as far as it went. He proved a shy breeder and had the honor of becoming the first member of the Kohberger herd to be made into buffaloburger. His head now adorns the dining room of Jake's Buffalo Inn.

Further search turned up another bull at the Catskill Game Farm, an unusual institution operated by Roland Lindemann outside of Catskill, New York, which is a place to remember any time you're in the market for the less common types of hoofed animals. Lindemann stocks a ready supply of such items as yaks, llamas, bison, water buffaloes, antelopes and several species of deer.

The Lindemann bull proved a very efficient sire, so efficient, in fact, that Kohberger realized he needed more cows. It so happened that fall, just a year after he had purchased his first stock, word again reached Jake that the City of Denver had some more buffaloes for sale. Another trek with the truck netted ten more head. Feeling buffalo-wise by this time, he went further afield, picking up another ten animals in Montana and Nebraska. This gave him a herd of some thirty individuals and he began to regard himself as a professional buffalo man.

Then things began to happen. While Jake's farm has a good share of level

bottom fields, he's located in that part of Pennsylvania that is particularly noted for its striking mountain scenery. One of these mountains rears up at a ninety degree angle right behind his barn. Having heard of the buffalo's reputation for sure-footedness, Jake decided that this hillside and the plateau on top were just the spots for his herd that winter. Either the buffaloes forgot their reputation or the Alleghenies proved rougher than the Rockies, for two of them fell off the hill and injured themselves so badly that they had to be destroyed.

Then two of them got into a fight in the barn and both died of injuries. It was then that Jake came to the unshakable decision that buffalo need plenty of range.

"They're fighters," he says, "and when they get to fighting in close quarters there are going to be dead buffaloes. Out in the open the one that's getting licked can run away."

For the next two years Jake's buffalo fortunes ebbed and flowed and eventually he found himself with a total of fifty-six head. This, he found, was just about twice as many as his 180 acres of pasture could safely handle. Though buffaloes are closely akin to cattle, in many ways they're much more like sheep, particularly in the close manner in which they graze and in their vulnerability to internal parasites. This calls for constant changes to fresh pasture and has led Kohberger to the conclusion that his minimum range requirements are about ten acres per head. The Fish and Wildlife Service of the Department of the Interior, which controls most of the Federally owned herds in the country, recommends stocking at the rate of two buffaloes to the same amount of pasture as would be required by three domestic cows.

Kohberger assembled his whole herd in two years time. After it had reached peak size he found no trouble at all in disposing of his surplus stock. So keen did he find the public desire to sample buffalo meat that he opened his famous Buffalo Inn in 1950. Here, right next to the pasture where the herd is grazing, the tourist can dine on buffaloburgers and buffalo steaks, and if he likes it well enough, which he probably will since it doesn't taste much different from good beef, he can take some meat home with him. The current price for buffaloburger is $1.75 a pound. Steak sells at $2 a pound—no ceiling prices, of course.

Jake's buffalo are raised on a regular cattle diet—hay and grain. The animals off the ranges would not take to grain at first, so he started them off with a little sweet horse feed; later he mixed some "chop" (ground corn and oats) in with the horse feed and gradually increased the amount of chop until they were getting chop alone. On winter pasture they get mixed hay and ear corn, which they con-

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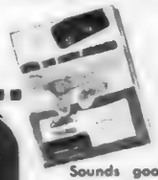

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sume with considerable relish. They do not finish as efficiently or as quickly as beef cattle, but they do well on rough feeds.

Butcher stock is slaughtered at about four years of age and is grain fed in the barn for three to six months before killing. Kohberger figures that at current prices he grosses about $1,000 per head out of each animal. His big bulls will weigh around 1400 to 1600 pounds at slaughter and dress out about fifty per cent. Besides his Inn he has a ready market for the meat with hotels and clubs. He mounts and sells the heads, has the hides tanned and made into jackets, robes, gloves, wallets and other saleable items; the legs and hoofs wind up as desk lamps. The tongues are pickled and make a tasty appetizer at the bar of another family enterprise, the Buffalo Tavern, operated next door to the Inn by Jake's daughter and son-in-law.

The Buffalo Market

Jake's success was reached the hard way. It took considerable patience and hard cash to learn the pitfalls of raising buffaloes. They are rugged, tough animals in the wild state, but under farm conditions they are not easy to raise. First, there's the fence problem. Good, stout six foot No. 9 gauge woven wire will hold them under ordinary circumstances, but if the herd suddenly decides it wants out, it will have no trouble making its own gates. The Fish and Wildlife Service advises that corrals and chutes be made of planks or poles. Besides the advantages of strength, the Service also notes that "they are easy for a man to climb, which is a distinct advantage when he is seeking to escape an infuriated animal."

Which brings up the matter of buffalo temperament. Pete Rosander, a Belle Fourche, South Dakota, rancher, who has been working with Buffalo for a good many years, and who has had some success in crossbreeding buffaloes and Brahma cattle, says, "It took me seven years to find out that the buffalo is not the wild, vicious animal I had read about in history." He has so gentled his herd that they nibble hay out of his hand. And that's a genuine display of confidence, for Pete is a cripple. He dehorns his stock, but this, he says, is because "they are mean to one another."

Others, particularly those who are still around to talk about it, take a decidedly different view of the buffalo's disposition. Kohberger, for example, says, "They're dangerous. You have to watch them all the time. The cows are worse than the bulls when they have a calf. A couple of years ago we were trying to take a three day old calf away from its mother to raise it as a pet. She got wild and jumped on it and killed it before we could get to it. We don't even try to castrate our bull calves because it's too dangerous to work with the herd that much." Buffalo raisers who do castrate have much sturdier equipment than Kohberger.

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Buffaloes can't be driven like cattle, either. Kohberger says, "They're like hogs; scatter in all directions. Best way to do is to tempt them with hay. Once we were trying to drive forty head through a gate from one field to another. There were six of us behind them with pitchforks and sticks. Got them within thirty feet of the gate and they all turned around and charged us. One of them grazed past me—scared hell out of me. We were lucky nobody got hurt bad."

When a buffalo sticks his tail in the air and shows the white of an eye, old buffalo hands take out for the nearest fence.

Buffaloes originally ranged over a considerable portion of North America, so they are at home with practically all kinds of our native grasses and legumes. They can stand winter weather in practically all parts of the United States without supplemental feeding or shelter. This particular characteristic has inspired numerous cross-breeding projects with domestic cattle, but none of these have been entirely successful. The resulting "cattalo," as they are called, are to a high percentage sterile, only males with as little as 1/32 buffalo blood being found completely fertile, and there is a high mortality rate among cows and calves. Contrary to popular belief, it is not the hump that causes difficult delivery for a domestic cow bred to a buffalo bull, for the hump does not develop until later in life, but rather the trouble is caused by excessive amounts of amnionic fluid, the liquid in the placenta in which the unborn calf grows.

Our early settlers noted that there were never any diseased animals in the buffalo herds. This was due to the prevalence of the wolf packs that followed the herds and picked off the weak members, rather than to natural immunity to disease and parasites.

Internal parasites, as noted above, in the form of lungworms, stomach worms and intestinal worms are a common cause of pneumonia, anemia and death in domesticated herds. Most buffalo raisers now use liberal doses of phenothiazine to combat these pests.

As the buffaloes shed most of their hair in the summertime, gnats and flies are particularly troublesome and the herds must be provided with wallows where the beasts can coat themselves with mud to find temporary relief.

All the most common diseases of cattle also affect the buffalo. They fall victim to blackleg, hemorrhagic septicemia, anaplasmosis, Bang's disease, and necrotic stomatitis, or sore mouth.

To prevent sore mouth, the Fish and Wildlife Service cautions against feeding hay containing grasses with stiff, sharp awns, such as foxtail and needlegrass, and suggests that a new place for feeding be selected daily, since feeding on the same ground allows unused feed, manure and other waste to accumulate and furnish suitable breeding sites for the organism of necrotic stomatitis.

One of the largest privately owned buffalo herds in the country was troubled by internal parasites for some time. This was the herd belonging to Gene Clark, the ex-California plumber out in Independence, Kansas. Clark has 312 head on his 1180-acre ranch. He vaccinates all his calves and practices strict parasite control.

Another little hitch in buffalo breeding is that while heifers usually produce their first calf at three years of age, cows are likely to be irregular breeders and do not bear calves every year. However, they retain their fecundity to a rather advanced age, instances having been noted of twenty-five-year-old cows producing well developed calves.

Ed Butters, who transplanted a herd of 175 buffaloes from South Dakota to his Coldwater, Michigan, farm back in 1945, reports that a seventy per cent calf crop is considered pretty good.

Any one still interested in going into buffaloes after reading through this catalog of breeders' blues can obtain foundation stock from the places indicated in the accompanying list. The U. S. Department of Interior, Fish and Wildlife Service, Washington 25, D. C., maintains the herds at the National Bison Range, Montana Wichita Mountains Wildlife Refuge, Okla-

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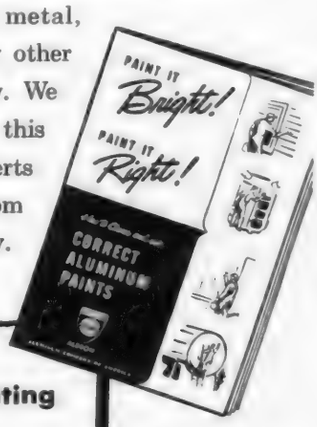

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It's that spirit, that willingness to take a risk, that helped build America. It was true of the early explorers and fur traders, of the Henry Fords and the John D. Rockefellers. And it's true of thousands of today's business men. Yes, and millions of farmers, for every man who ever put a seed in the ground remains inevitably a speculator.

But *should* you speculate? Specifically, should you speculate in commodities and thus elect to share with the farmer the natural hazards of bringing a crop to market?

The answer depends on you—on your temperament, on your financial ability to carry the risks involved, and above all things, on your knowledge of exactly what you're doing. For the man who buys or sells futures contracts without the most complete and reliable information he can lay his hands on—information about crops, markets, and prices—isn't a speculator. He's just a fool.

So if you want to speculate, we'll be glad to consult with you about the outlook for any commodity market and about the extent to which your own situation will prudently permit you to speculate.

As a starter, you might like to study our little pamphlet *"Speculation as a Fine Art."* You'll find it a challenging review of the certain risks and the uncertain rewards of speculation. We'll send you a copy without charge or obligation, of course. Just write—

Commodity Department "K"

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homa, Fort Niobrara National Wildlife Refuge, Nebraska, and Sullys Hill National Game Preserve, North Dakota, and disposes of the surplus animals annually.

The Fish and Wildlife Service advises that the demand for these surplus animals now exceeds the supply and the Service has had to resort to a lottery system to distribute available live animals and meat equitably among the many persons placing orders.

During the season 1951-52, 218 adult and 30 young buffaloes were offered for sale. The government prices were $150 per head for the adults and $140 for the younger specimens, loose; $190 and $175, respectively, crated.

The State of Kansas, Forestry, Fish and Game Commission, sells surplus animals from its Garden City herd at $150 per head and the Catskill Game Farm gets $550 per pair for calves and $1,200 for fully grown pairs.

At the turn of the century there were less than a thousand buffaloes in the United States. Despite the elimination of surplus animals, there are now more than five times that many, a very healthy increase. Anybody can go into the buffalo business if he is willing to expend the cash and patience to learn about the highly volatile temperament of a wild animal not yet thoroughly domesticated.

Where to Buy Buffaloes

Herds under the jurisdiction of U. S. Dept. of Interior, Fish and Wildlife Service.

National Bison Range, Moiese, Mont.

Wichita Mountains Wildlife Refuge, Cache, Oklahoma.

Fort Niobrara National Wildlife Refuge, Valentine, Nebraska.

Sullys Hill National Game Preserve, Fort Totten, North Dakota.

Other Sources:

Catskill Game Farm, Inc., Rt. 1, Catskill, New York.

Gene Clark, Independence, Kansas.

Ed Butters, Coldwater, Michigan.

J. J. Kohberger, Buffalo Inn, Lock Haven, Pennsylvania.

State of Kansas, Forestry, Fish and Game Commission, Pratt, Kansas.

Other state parks and individual breeders occasionally sell surplus animals.

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Riding equipment for farm use, pleasure and show. English and Western saddles, bits, bridles, spurs. Stable blankets. Girths. Caveson sets. Other horse equipment.

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Baby beef, cow, calf or bull show halters. Complete selection. Cow blankets in all sizes.

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Today, as for the past 51 years, Boyt is still making the strongest work harness in America. Also available are horse collars, body belts, tarpaulins, hunting and fishing equipment, and many other items of particular interest to the farmer and sportsman.

FREE CATALOG — Leading harness, hardware and implement dealers feature Boyt items. For free catalog, write The Boyt Co., Dept. L, Des Moines, Iowa.

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SECURITY

Lightning Protection in the Modern Manner

FARMING IN THE HOLY LAND

(Continued from page 33)

neighbor who knows about those things helped us and when we saw it was a heifer we all shouted happily. We would have two cows to milk and our herd would grow." The calf was out of a black and white European cow by a Damascene bull.

The eggs and vegetables and Abraham's work on other farms brought in enough money to add a mule to the livestock and a few clothes to replenish the tattered wardrobes of the family. The second year there was more water and Abraham planted three acres in watermelons and tomatoes and some grain for the cows and chickens. He went in debt for another cow, a purebred animal imported from the United States, and an electric ice box was sent them by a relative in America.

He has what his friends call a green thumb and his melons are famous for their size. The children, coming home from school in the afternoon, pitch in to weed the vegetables and help Ruth with the chores around the hen yard. The whole family piles into the jeep when the vegetables, milk and eggs are taken to the cooperative. There they buy their supplies and trade gossip with their neighbors. Sometimes there is a dance and a movie, sponsored by the cooperative. Some attend the synagogue.

The Thief in the Night

Once a month Abraham has an unpleasant task: he goes out to join the ring of guards around the settlement, posted each night to watch for Arab marauders from across the border. At first a rifle was a more unfamiliar implement to him than the plow had been. But he was lucky, during his first turns of duty, to have with him a good friend, Aaron Matitiahu, a former member of the Israeli army who knew how to use a gun and how to protect himself. Aaron carried a Sten gun and Abraham a rifle.

To Abraham the fields at night were a menacing expanse of darkness. During the day, with people working in the fields and animals grazing contentedly in the pastures, it was friendly and familiar. But when the sun had set and the night shadows began to creep over the horizon, they brought with them unseen and unknown dangers. He felt these dangers now, and dreaded the night before him.

He and Aaron scooped out a shallow trench for themselves on a rise overlooking the border to the east. Darkness came quickly, and with it a penetrating chill. They huddled together, pulling their blankets close around them. Each took his turn at watch while the other dozed, trying to forget the cold and the discomfort and to conquer the fear of what the darkness might bring.

It was past midnight and the moon had set. Abraham was on watch, and just as on all those other nights, his imagina-

Forage Harvester with patented Row-Crop Attachment

● More Gehl Choppers have been sold than those of any other independent manufacturer . . . often imitated, never equalled. Row Crop Attachment, shown here, has auger-type gatherers, exclusive with Gehl . . . minimize field trouble, do not knock off as many ears.

The Gehl gives you that highly-important *clean, fast, uniform* cutting which makes better feed . . . silage that packs better and keeps well. Many other features, exclusive with Gehl, result in extra rugged Gehl dependability and trouble-free operation year after year.

QUICK CHANGE-OVER ATTACHMENTS

The Hay Pickup, Corn and Row-Crop Attachment, or new Gehl Mower-Bar for short and tall grass silage crops sown broadcast, all give outstanding performance. All three quick change-over attachments go on as assembled units . . . easily and quickly. Field chopper may have its own motor or power take-off from tractor. Powerful Gehl Tilt-up Blower, for either forage or grain, with power take-off to operate self-unloading wagon.

Gehl dealers have been selling Forage Harvesters more years than most dealers . . . some have sold other makes before switching to Gehl. Talk with Gehl owners.

FREE PACKET . . . New booklet: "Streamlined Methods of Harvesting Hay and Making Grass Silage" . . . colorful Catalog of Gehl Forage Harvester . . . *free plans* for building self-unloading wagon box, using Gehl metal parts kit. *Write!*

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ONLY ONE MAN DOES THE JOB . . . the Gehl Row-Crop Attachment shown here in corn has the famous Gehl patented auger-type gatherers.

Gehl Chopper is shown here with the new Mower-Bar Attachment harvesting soybean and Sudan Grass mixture. Only one man mows, chops and loads in one operation.

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"MY LEACH SILO UNLOADER WORKS GREAT ON GRASS SILAGE"

"Our Leach Silo Unloader really works great on grass silage in saving valuable time. Our cattle eat more of this silage because it comes down from the silo in flakes, not chunks as when I pitched it out. Also, I don't have to climb the hazardous ladder every day. The unloader does an excellent job in frozen silage."
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"I have used a Leach Silo Unloader since 1946 and it has been one of the best assets on our farm. Don't know what we'd do without it."
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"My Leach Silo Unloader acts as my hired man. It handles the grass silage in a fine manner."
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"We have had a Leach Silo Unloader working in grass silage for the past year. The discs bring the silage out in good shape, whether frozen or not. The silage is more fluffy, and there are no chunks or flakes to worry about. It throws down enough silage for 64 head of beef cattle in 18-20 minutes."
W. V. MYERS, Shiloh, Ohio

"It took a lot of convincing to sell me a Leach Silage Unloader. Now that I have used it this winter, feeding grass silage, I cannot say enough praise to show my satisfaction. Cattle clean it up for the first time since I've started feeding silage in 1946."
KENNETH A. LARSON, Hadley, Minn.

"I am happy to state that your Leach Unloader does a wonderful job, and I wouldn't be without it. I just flip the time switch and my feeding chore is over."
EDWIN KRUSMARK, Currie, Minn.

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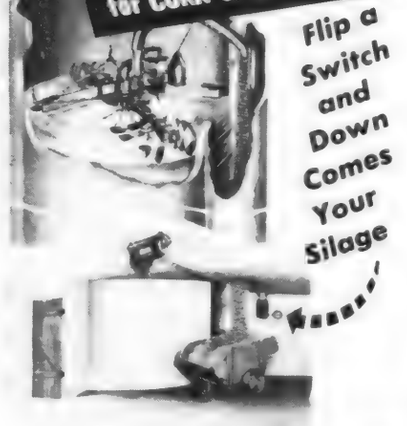
Silo Unloader
for CORN or GRASS Silage



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tion began to play tricks on him. A deeper shadow under a slope, a patch of darker earth, a heap of stones, all became to him living and moving things, closing in on him, ready to spring, dissolving, then forming again. On this night the darkness was charged with a special tenseness: he felt an intuition of danger, a foreboding of something about to happen.

Then his eyes fastened on a dark mass off to his right. "Is it moving?" he asked himself. "No, it was only a shadow." But his eyes came back to the spot, and it seemed to him it had moved. Then he thought he heard a stone roll away in the darkness—the heavy, quick breathing of some creature. He awakened Aaron. "Look over there; is there something there!" He and Aaron watched in silence for a long time.

Yes, it was moving. Aaron shouted, "Who's there?"

A volley of shots answered his shout. The dark mass divided: there was the grunt of an animal. Then suddenly, very near to Abraham's head, Aaron fired a short burst from his Sten gun. Then a longer burst. There were shouts and cries from the moving mass, a few scattered shots. It melted into the darkness.

There was no more dozing that night for either of them. They sat, wide awake and tense, expecting each moment for hands to reach out of the darkness and strangle them, to feel cold steel against their throats. They knew how clever the Arabs were; Abraham remembered how a neighbor of his had been found one morning lying in the doorway of his barn, stabbed to death before he knew there was anyone near him.

Finally, after an eternity, the pink fingers of dawn touched the eastern sky. Abraham and Aaron got up stiffly and walked to the spot where they saw two shapeless forms lying on the sand. They found a dead Arab and a dead cow.

The danger of raids was not confined solely to the hours of darkness. Knowing that girls and young boys often stood guard in the daytime, some of the Arabs made snatch raids on stock grazing in the fields. Every night the cows and sheep had to be driven into the communal barns, which were locked and guarded.

Abraham Gets Along

Abraham trades labor with his neighbors when he harvests his tomato crop. Normally he is not permitted to hire extra labor, for the Moshav constitution allows a householder only the amount of land he and his family can operate alone. When his children got older and were able to do more work, he leased five more acres from the Jewish National Fund. He still rents machinery from the pool, and does all his trading at the cooperative, but he is essentially a private farmer and looks forward to the time when he can own his own tractor and other heavy machinery.

This Nation of Israel

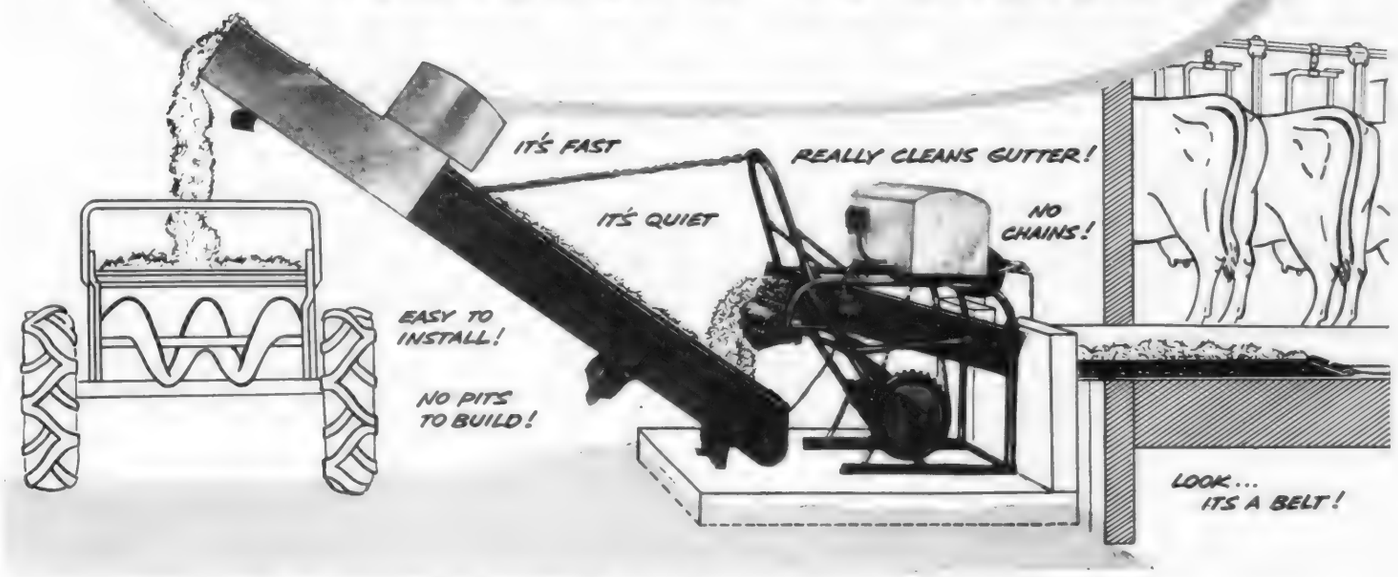
Israel is shaped somewhat like a spearhead with the point resting on the Red Sea. The wide part of the head and the point are barren and dry—almost a desert. The bulk of the population lives in the northern part. A country normally supporting a little more than half a million, the more productive part bulges with a population which has doubled in the last ten years. It is a little larger than New Jersey, about 300 miles long, from 6 to 75 miles across. Half the arable land must have irrigation to grow good crops.

The search for water in Israel is as old as the country itself. Water in Galilee, in the northern end of Israel, costs as little as one sixth of a cent a cubic metre. Water in the Negev, in the southern parts, costs as much as $22.50 a cubic metre. There are frequent traces of old Roman aquaducts which brought water to arid areas by gravity. In even earlier times the ancients built dew mounds, piles of stones on which the dew collected, percolating down to the soil beneath. The most common method used today to find water for irrigation purposes is deep drilling. At times borings must go a thousand feet before a supply can be found. Experiments are also being conducted to find the best way of conserving the millions of gallons of rainwater which pour torrentially into the gullies during the rainy season. Large dams, both shallow and deep, are being tried. Long-range water conservation and supply schemes have also been mapped out, and work has already begun on the Lake Huleh project, the most important of these, engineered by the well-known Prof. W. C. Lowdermilk who was in charge of the TVA project.

The Negev, the southern spearhead, is about as large as the rest of the country, and if water could be had plentifully and cheaply at least a million, and probably two million, people could be settled there. To supply the water, it is planned to channel the waters of the Yarkon River, now flowing uselessly into the sea at Tel-Aviv, down to the Negev. Within a few years, it is hoped to bring fifty million cubic metres of water a year to the area.

The Bible called the Holy Land "the land of milk and honey." Today Israel might be called "the land of very little milk and no honey at all." The beehives continue to produce their excellent orange and eucalyptus honey, but it is all going abroad in Israel's export drive to earn dollars. As for milk, the ration is small, a glass of milk per day for adults, a glass and a half for children. The milk is 50 per cent whole milk, 50 per cent powdered milk from America. Israel is far from self-supporting. She imports meat, wheat, eggs, fodder, onions, potatoes, butter, sugar, rice, and all basic raw materials and machinery. Israel used to have enough locally produced high quality soap left over after her own use to export to the

IT ALWAYS WORKS!



Hercules KLEEN-EZY* Belt-type Barn Cleaner

AT LAST, a barn cleaner that really works! Conveyer Belt Principle—proved by industry—is the most dependable way to handle tough jobs. The only thing in gutter is a belt. At throw of clutch, belt moves out of barn, up chute to spreader. Gutter is wiped clean. Power return winch rapidly draws belt back into gutter. Before you buy, see the Kleen-Ezy "Belt" Cleaner! *Check the features at right:*

Easy Installation. You can do it yourself with no major alterations, no cross gutters.

No Chain in Gutter. No chain to break, metal to rust, wood to rot. Dependable.

Quiet. No clank or clatter to disturb cows.

Long Life. Tough rubber belt virtually impervious to acids, manure, mildew, moisture, and rot.

Really Cleans Gutter. Carries out solids and liquids, and wipes gutter clean.

No Cross-Pieces. Can't trip or injure cows.

Fast. Cleans 100-ft. gutter in 4 minutes.

No Pits to Build. Belt goes directly up chute and is wiped clean before return to gutter.

Low Power. 1-h.p. motor gives ample power for cleaning up to 100-ft. gutter.

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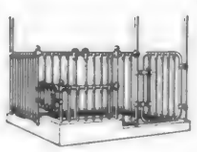
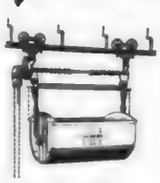
Stalls and Stanchions. Save up to $2.50 per stall on installation costs with Hudson. Every type: stanchion stalls, tie stalls, milking stalls.

Sani-Kleen Water Bowls. Non-siphoning. Bowls nest. Easy to clean. Trouble-free freeze-resistant valve. Easily accessible. Steel or cast iron.



Dairy Barn Pens. Insure healthier, more profitable stock. Cow, calf, young stock, bull types. Panels and gates pre-assembled for easy installation.



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Anytime!

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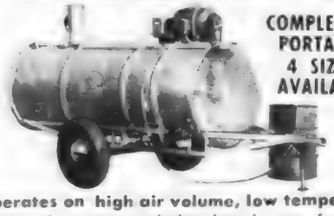

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Here's a new piece of equipment that will make you real money. Stop worrying about wet weather crops by using a Habco batch type drying bin. This steel bin allows you to use the picker-sheller for harvesting corn . . . eliminate sick wheat . . . condition all tough and damp small grain for safe storage. It's equipped with electric augers and handles up to 100 bushels per hour. Investigate Habco today.

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U. S. and Europe. Today the soap ration is 100 grams (a bar) a month. What has happened to reduce this once fertile and still potentially fertile land to this condition of food and commodity shortages?

The answer lies partly in the dizzy rate of immigration and partly in the nature of many of the new immigrants. When Israel won her independence in May, 1948, there were about 650,000 Jews in the country. In four years, this figure has doubled. From the very first, Israel has followed a policy of unrestricted immigration: any Jew, anywhere, can enter Israel and settle there. Production, in agriculture as in industry, has not been able to grow as fast as the population. The number of settlements have been doubled; there are now almost 700 of them. However, they have not been able to produce enough food to supply the population. The problem is comparable to what the American farmer would face if the U. S. were to take 150,000,000 immigrants in four years. Moreover, many of the immigrants come from Arab countries in the Middle East and North Africa, from Iraq, the Arabian Peninsula, Morocco, Tripolitania, Tunisia, where they have lived in towns and earned their livelihoods as merchants, clerks, and professional men, and come to look down on physical labor, including dirt farming, as an inferior way of life far below their dignity. To induce these people to go on the land, the Government and the Jewish Agency have offered them attractive advantages, but only a fair proportion have responded. The result is that the country does not have enough land under cultivation to feed itself. The Government is now pushing a four-year plan which, if successful, will go far towards making up the shortages, but certain items, such as meat, will have to be imported for many years to come. In addition to subsidized prices for certain products, the Government also gives outright grants to farmers who will undertake to cultivate the Negev. About 125,000 acres have been offered to farmers with the added attraction of a free gift of $11.20 for every acre worked; the farmer keeps the yield.

Much of the Land of Israel is not yet suitable for farming. Hill terraces built by the ancients have crumbled. Forests have been denuded, and erosion and neglect have worked their will on the soil for centuries. Now terraces are being rebuilt. Millions of trees have been planted: eucalyptus to drain swamps, pine to clothe the hills, cypress to form windbreaks. Slowly soil is being nursed back to fertility. The Plain of Jezreel, where Gideon defeated the Midianites, was a malarial swamp thirty years ago. Even the Arabs shunned it. Today it is a green fertile valley, with more than a score of settlements. Not a case of malaria has been reported in years, and the farms contribute a high proportion of the stocks in the nation's larder.

In the old days, before the fugitive teachers, lawyers, peddlers, businessmen from seventy countries began swelling the farm population of Israel, the primitive agriculture of the country was all carried on by a peasant class of farmers. The peasant farmer hitched his donkey and his camel, or his mule and a bull, to a "nail", a tiny plow which scratched the earth. These peasant farmers are both Jewish and Arab. The rural Arab is either a Bedouin or a fellah. The Bedouin is a nomad and the last thing on earth he wants is to own a piece of land and be tied down by farm chores. The fellah was more stable and permanent on the land, but his methods were even more primitive than those of the Jewish peasants.

The peasant farmers, both Jewish and Arab, are being helped to acquire machinery and are being taught modern methods which they are quick to see are a great improvement over their Biblical, forked stick methods.

The Israeli farmer cannot get rich, but his earnings compare favorably with those of the rest of the community. His life is often austere, his work hard. But his children get the best care and education that modern science can offer, his future seems promising and on the whole he has the satisfaction of knowing that the job he set out to do, the job of providing a nation with a well-to-do class of farmers, a class it has not had for almost twenty centuries, is well on its way.

THE AUTHORS: Tomas D. W. Friedmann came to the United States in 1951 from Israel where he was a magazine and news photo-reporter. He has covered the building-up of Israel during the last 18 years, and is regarded as an authority on the young state. Friedmann, who also worked for the Associated Press in Israel, has now founded his own agency, "P. I. P." (Photographs & International Publicity) through whose auspices this story was compiled for Farm Quarterly.

Myrim Eskolsky is an American who migrated to Israel 15 years ago. Previous to that he worked in the Publicity Department of the Jewish National Fund in London. In Israel he was for some time a member of Kibbutz Naan, then editorial writer on the former Palestine Post, now the "Jerusalem Post," the only English language daily newspaper in Israel. He is 36 years old.

12 SPECIAL PAINTS

(Continued from page 82)

ing for natural wood effects. Use "White Firzite" to lay the grains or new wood prior to painting or in getting blond wood effects.

A NEW kind of paint brush called a "Fleet Wing" has been developed by Pittsburgh Plate Glass. It is light-weight and covers a large area quickly.

To mention one more, there's "Sapolin Glass Frosting" that reduces glare, diffuses light or creates privacy. It will frost, for instance, a clear glass bathroom window very successfully, if applied on a cloudy day when the temperature is between 60 and 70 degrees. Direct sunlight or excessive heat or cold retards formation of the crystals, and the manufacturer's directions must be followed carefully.

It is essential to follow the manufacturer's directions to get the best results from any of the new paints. Reading the label is about the only step in the painting process that remains old fashioned.

THE AUTHOR: Mary Catherine Lloyd is a former newspaper woman. She grew up on a dairy farm and has had a taste of just about every kind of farm work. In preparing this article on household paints she repainted a number of rooms in her home to try out the covering and working qualities of the paints.

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a hard, durable, water-resistant masonry finish that colors and thoroughly seals all damp and wet porous masonry walls.

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A truly accurate and quick method of knowing moisture content in your crops. Enables you to control harvesting scientifically. Used by leading farmers everywhere

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American CROP DRYING EQUIPMENT CO.
CRYSTAL LAKE, ILLINOIS

SUPERFLY

(Continued from page 63)

should be coated with a methoxychlor solution. This chemical, which is related to DDT, is permitted in the milking parlor and the milk room where DDT cannot be used. It has a good residual effectiveness which lasts from six weeks to two months. It is recommended that the walls and ceilings be wet down at the rate of one gallon to each thousand feet using a two and one-half per cent solution of methoxychlor water suspension.

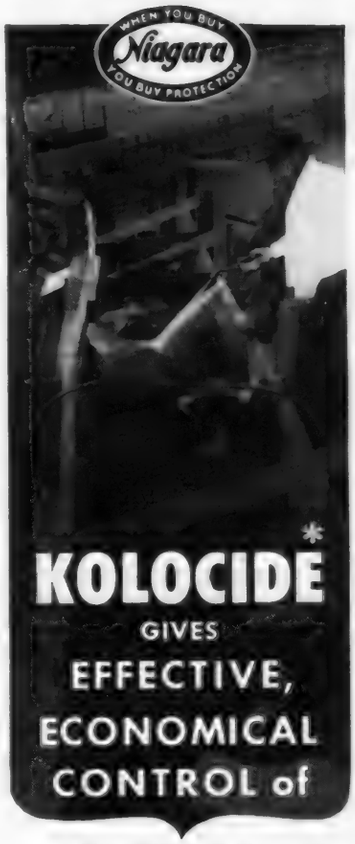
Charles Foster, a Wisconsin, dairyman, offers this tip on mixing the solution, "You start by figuring the weight of water at eight pounds to the gallon. So, if you're going to make 100 gallons of spray, you will have 800 pounds of water to start with. If you want a two and a half per cent solution, you know that there will be two and a half pounds of methoxychlor for each hundreds pounds of solution. Eight times two and a half is twenty. Simple—but there is one little catch. Methoxychlor generally comes as a 50 per cent powder—that means that you have to use twice as much, or 40 pounds to your hundred gallons."

Since the cost of material is only about half the bill when compared with the work or expense of spraying the insecticide onto the walls, many farmers are combining spraying with painting. The paints which have been found effective for this dual purpose are not the oil paints which seal up most of the insecticide in the paint, but rather a material that is comparable to white-wash. As a wood preservative this type paint has no value, but as a whitener it is excellent. At present there are two brands of such paint being produced, Sani-White, manufactured by a division of The Borden Company, which contains chlorodane and toxaphene, and Carbola, a product of The Carbola Chemical Company, which contains methoxychlor and lindane.

Fred Morris, of Amelia, Ohio, had his barn painted with an insecticidal paint by a custom sprayer and found that material and labor for the job were almost equal. For enough paint to cover the four walls and ceiling of a 40 by 90 foot area, a second room 30 by 20 feet, and a 20 by 12 foot hen house, he paid $36 for material and $25 for application.

"I had the spraying done late in August," Morris said, "and didn't have to use a knock-down spray the rest of the fly season, which was six weeks. For the first month, it was very effective, and for the next two weeks until frost I would call it fairly effective. The white paint made all the difference in the world as far as appearance goes. The milk inspector was really impressed with the clean look of the place and the lack of flies.

"As far as lasting effect goes," Morris continued, "I suspect that I'll have to



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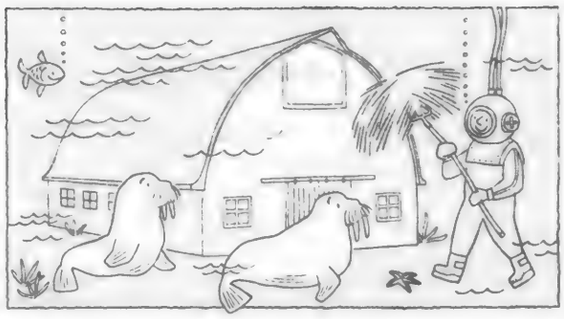

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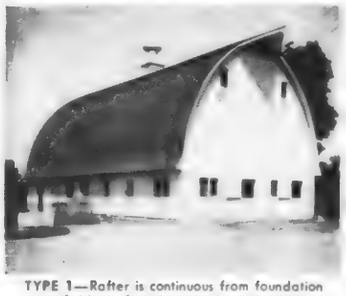

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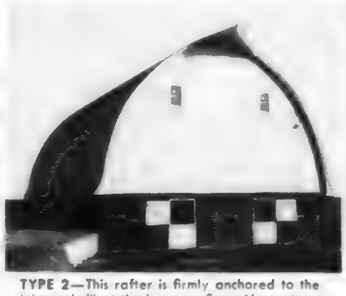

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spray twice during the summer. I could spray once with the paint and then go over it with just insecticide, but with spraying costs what they are I think it would be such a small saving that I'll use the paint both times. One drawback that I saw was that when the sprayer got through he had not only covered the walls and ceiling, but had double frosted the light bulbs and whited out the window."

A friend of Morris', who lives some 20 miles away, had the same job done and reported that the job was not nearly so effective. "Everything *looks* wonderful," he told Morris, "but I could have killed almost as many flies with white wash as far as I can see."

The difference between the two jobs undoubtedly was due to a difference in flies and the different custom sprayers who applied it. Since the paint is loaded with insecticides that are related to DDT, it won't have the same killing power with DDT resistant flies that it does with their weaker cousins. It *will* hold the common flies in check while the super-flies are destroyed with pyrethrum.

Give Them the Works

Resistance to DDT or one of the other chlorinated compounds usually means that the flies have some resistance to all of them. Their resistance will vary from one compound to another, however, and this may prove fatal to them. If their resistance is not high enough to save them, they'll be just as dead as they would be without any resistance at all. The chart on page 49 gives an idea as to the effect other sprays have on DDT resistant flies. Because resistance varies, the experts recommend insecticides be alternated so that we give the fly a one-two punch.

Four alternating wall sprays which have proved effective are: (1) A five per cent water solution of DDT with 10 per cent pine gum rosin added as an adhesive agent to make it last longer. This solution should be applied at the rate of one gallon per thousand square feet. (2) A lindane and water solution mixed at the rate of 10 pounds of lindane to 600 gallons of water. One gallon of this solution will cover 500 square feet of surface. This is a mid-summer spray since lindane does its best work at high temperatures. It is particularly effective for use on hogs. (3) A mixture of one pound each of six per cent benzene hexachloride and 50 per cent wettable DDT to each six gallons of water. Each gallon of this spray will cover one thousand square feet. (4) A mixture of one pound of methoxychlor wettable powder and one-quarter of a pound of 25 per cent lindane to each six gallons of water. This solution, too, is used at the rate of one gallon per thousand square feet.

Other sprays which might be included among the alternates are those containing gamexene, chlordane, heptachlor, dieldrin, dilan, aldrin, TDE, Toxaphene, and glycole 800. The concentrations and best uses for those sprays are shown in the chart on page 49.

The sprays should be applied with hand sprayers or, better still, with power sprayers, laying down an even film of spray until the liquid runs off the wall surface.

Alternating sprays is recommended since switching from DDT to a single other spray may simply mean switching the breed of resistant fly. Last year Gamexene (benzene hexachloride), a chlorinated insecticide related to DDT, was believed to be the farmer's answer to the fly; now the Navy has found resistant flies in Egypt. In 1950, Dr. James Ayers, of the Illinois Agricultural Experiment Station, recommended lindane (another form of benzene hexachloride) as a solution to the DDT resistant super-fly. He cautioned that lindane resistant flies might show up, and this year they did.

In addition to spraying the barns, hog-houses, chicken houses, and other buildings with the basic methoxychlor spray and the alternates, the farmer should keep his eye open for other fly hang-outs. Under the eaves of barn and house and in the attic along the ridgepole, occasionally in a wood pile, you can see flies making their home. Remember the places and

touch them up with spray the next time the job is done.

There is a U.S.D.A. recommendation against using certain of the insecticides directly on animals. DDT, for example, cannot be sprayed onto the animal because it is absorbed by the animal and can be found in its milk and meat. Lindane may only be used once or twice a year for louse control.

At present a 0.5 per cent methoxychlor water suspension is recommended as an animal spray to be used every two or three weeks throughout the summer and early fall. One to two quarts per cow of this solution should do the trick with most of the spray going on the front half of the animal; the cow's tail discourages the flies in the rear area.

In the Southwest, methoxychlor concertrations higher than those recommended above have been found to be practical for horn fly control on beef cattle. If this higher concentration is used, only three-fourths to one quart per cow is required. Calves should be treated with the more dilute spray.

In spraying cattle, pressures of 400 pounds or more are necessary to force the spray under the hair. If a hand sprayer or a low pressure apparatus is used, the spray nozzle should be held close to the animal for thorough wetting and more spray will have to be applied.

Birth Control

An entomologist with a mathematical frame of mind once calculated the potential offspring of a single female fly during one season. Assuming the fly was fertilized and laid its first batch of eggs in April, and that all these and subsequent eggs hatched, it would be capable of producing the astronomical figure of 191,000,000,000,000,000,000 descendants by September! It is clear that spray alone won't reduce the fly population; fly breeding spots must be eliminated as part of the program.

Ninety-five per cent of all houseflies are hatched and raised in manure. Though horse manure is the worst, human excrement and cow manure are also sources of flies. Since it takes but four to five days for fly maggots to complete their development, all material in which they breed should be disposed of twice a week. Manure that is spread over the fields dries quickly and stops being a fly incubator.

When found, the breeding site should be sprayed with chlordane, a particularly potent larva killer, and then cleaned up. With proper santitation, flies, whether they are super-flies or just the old garden variety flies, can be controlled.

THE AUTHOR: Richard Weiner, a former research assistant in the department of genetics of the University of Wisconsin, at present produces a weekly radio program, "The Sound of Science," heard in Wisconsin, and is working on a book which debunks "cracker barrel science" beliefs. He was born in New York City and is a graduate of the University of Wisconsin. He has written widely for scientific publications.

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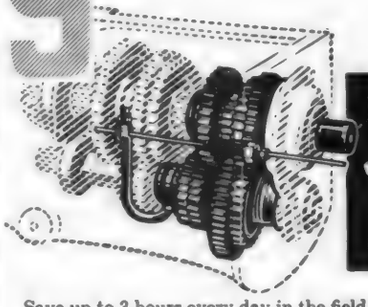

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SPUDS MAKE GOOD STOCK FEED

(Continued from page 43)

says "We have gotten satisfactory gains and adequate finish on our steers by feeding oats straw and whole fresh potatoes alone in a 160-180 day feeding period."

"We like to add either grain or one pound of protein to this basal ration, however, because the gains are a little greater, the carcass is marbled better, and our steers on these rations usually sell about 50c per hundred higher than those on straight potatoes and straw. When we add both grain and protein to the basal ration our profits are not increased enough to pay the added cost.

"Don't ask me why we can get gains of two pounds or more on a ration as low in protein as oats straw, potatoes and grain, because I don't know the answer. I just know it happens.

"In our little experiment we fed alfalfa hay with the potatoes, but our margins are much higher with straw and we have no trouble with scours.

"In our initial trial we tried slicing the potatoes for one lot of steers. We thought this might make them more palatable and prevent trouble from choking. Experience proved that choking is not a factor, though, so slicing didn't prove beneficial from that standpoint: also, slicing seemed to reduce the palatability of the potatoes so that the steers would reject them if fed in large quantities. We have never had this trouble with fresh whole potatoes. They eat all we give them.

"The grain in our oats straw, potatoes, grain ration is 70% barley and 30% oats. The straw is fed ad lib. The potatoes are fed as much as 80 pounds per head per day, morning, noon and night in equal portions. The concentrate or grain is sprinkled over the potatoes, not for palatability, but to get a more equitable distribution. Bonemeal, salt and water are available at all times."

Management on Potatoes

Then as to management, which, after all, in the majority of cases is the deciding factor between success and failure, Fausch continues:

"We like to get our steers on feed the first week in October, because that allows us time to get them accustomed to potatoes before cold weather. If the steers tend to scour a little from the effect of large quantities of potatoes, they will really feel it in cold weather. So we get them early and increase the potatoes very slowly. By the time our severe winter comes we have had them on maximum feed of fresh potatoes for some time and we don't have any trouble.

"Choking has given us no trouble. In the first place, we don't let our steers get hungry, so they don't gulp down the potatoes. Another precaution we take is in having a 2 x 6 plank about two feet above the feed bunk running parallel with the

trough so that when the steers are eating they cannot throw their heads up as they chew.

Scouring is the biggest difficulty with potato feeding if large quantities are consumed. Their high moisture content causes them to be quite laxative. As already indicated, we avoid scouring by getting our stock accustomed to the potatoes in good weather and by building up the quantity slowly. Good quality hay tends to increase the laxative effect of the potatoes and that is one of the reasons we favor oats straw over the hay.

"Feeding in small lots of about ten steers each seems an advisable plan, too. It is easier to watch the progress being made and to spot any that are having trouble. Another point here is that while the other steers are learning to like potatoes, a greedy one will not be able to get such an overdose as he might if he had access to all the potatoes being offered to a larger group."

Cattle on the ration outlined above can be expected to gain around two pounds a day and will finish out a good firm carcass with satisfactory marbling and desirable color in the fat and lean. Describing the carcases of a group of choice steers fed at the Northwest Station, professor P. A. Anderson of the University of Minnesota says:

"These carcasses were well covered with good, bright fat and the color of the lean was good. The eye muscle was uniformly large and marbled. This lot was the most outstanding of all lots and very acceptable. They would be highly saleable in any beef market."

These steers had dressed out 60.2% and sold for $36.50 a hundred.

Fausch states that the station's control lot of steers (steers fed on hay and grain rations) have consistently dressed out about one per cent lower than the potato-fed steers and ranked below them in fat covering. They were paunchier than the potato-fed steers, also.

Dairy Cattle Do Well Too

So much for beef feeding. How about dairy cattle? Again, the answer seems to be, potatoes are a good feed. The principal problem here seems to be in getting a steady supply of the spuds for the cows. The cows like them and they produce a good flow of milk, which is rather sharply curtailed if the potatoes become scarce and another feed has to be substituted in the ration.

Mike Skibiski, who operates the Skibiski Produce Company at Sunderland, Massachusetts, where he grows, stores and deals in potatoes and onions, has a steady demand for his culls at all times. Dairymen were paying from 50 to 70c a hundred for them at his farm all last winter. These dairymen want to be assured of a steady supply, that is, for at least two or three months, and for that reason he had to turn down a good many of them right

THE SEAMAN SELF-PROPELLED ROTARY TILLER

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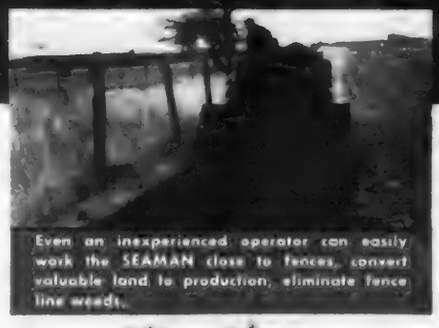

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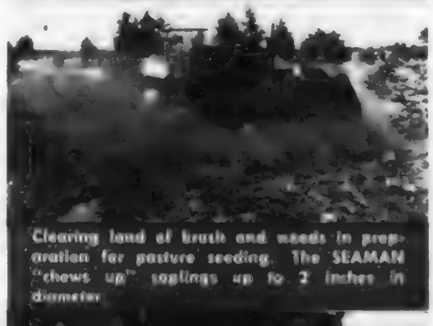
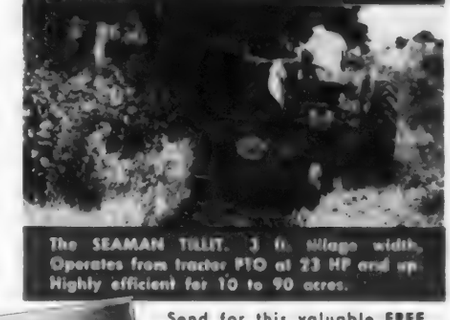


Clearing land of brush and weeds in preparation for pasture seeding. The SEAMAN "chews up" saplings up to 2 inches in diameter.



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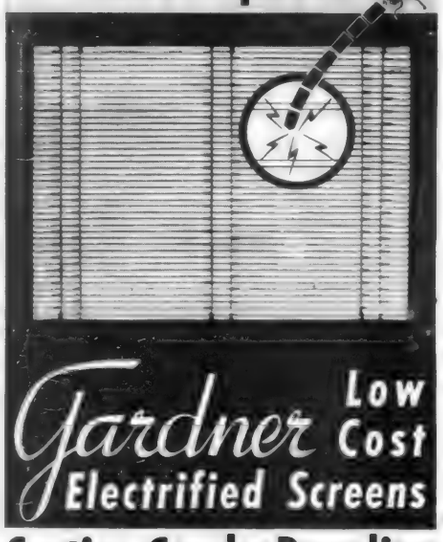

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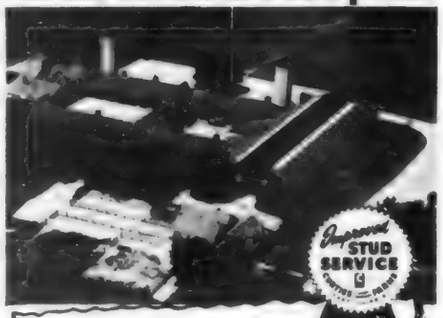

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at the beginning of the season as he knew his supplies wouldn't permit spreading through too many hands. In that climate the fresh potatoes can be easily kept sacked in the barn for three and four weeks.

It is best to keep the potatoes somewhere other than in the milking shed and to feed them after milking to avoid any possibility of off-flavor in the milk.

Potato silage has been found to be about equal to corn silage in feed value when used for dairy cattle, but farmers are usually cautioned against feeding more than about four pounds of either fresh potatoes or potato silage per 100 pounds live weight of the cattle.

A few farmers cook their potatoes before feeding them to their cows, but this is not at all necessary and simply adds to the expense.

Hogs Get Fat on Potatoes

In feeding hogs, however, cooked potatoes do seem to be superior to the raw ones, though even here there seems to be some division of opinion. R. E. Davis, Animal Nutritionist at U.S.D.A.'s Beltsville Experiment Station, for instance, is one who feels that there are still a lot of unanswered questions when it comes to feeding raw potatoes to swine.

"Everything so far seems to indicate that the potatoes should be cooked," he admits. "But when they make up only a relatively small part of the diet, raw potatoes may be fed just as successfully to hogs as cooked potatoes."

The cooking presents a problem of its own, of course. Mashed, French fries, or Au Gratin for a few hundred hogs is no small order. The more common way of accomplishing this feat is by steaming them in kettles or drums or even in the bed of a truck in which steam pipes have been laid.

It is recommended that the cooked potatoes replace not more than one-half of the grain ordinarily fed in the ration. They should be fed in a well-balanced ration containing an ample protein supplement and minerals. They may be fed at the rate of two to four pounds of potatoes per pound of grain. In Europe, especially in Holland, Denmark, and Scotland, cooked potatoes are fed regularly to hogs, the only feed available in many localities. Almost every farmer has available cooking or steaming facilities at his local creamery. A cooked potato, stored on straw in a trench and covered with a foot of soil, will keep well for two years.

Dehydrated potatoes, in balanced rations, have a feed value comparable to that of the common grains when used for feeding pigs.

Philip Schaefer, who has had good luck with potatoes and pigs out at Monte Vista, Colorado, says he cooks up a mixture of seven parts potatoes to one part barley. He puts the potatoes in his cooker, covers them with water and seals the top

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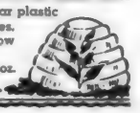

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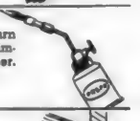

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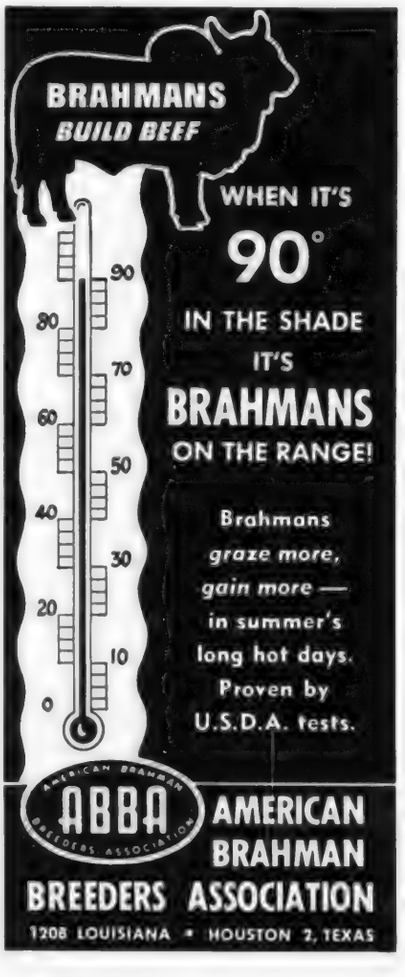

with barley and lets them come to a boil. After they cool, he feeds them in troughs. His hogs are always ready to eat this concoction, and thrive on it. He has never had any losses that might have been attributed to it.

Sheep do well on potatoes, too. With good legume hay and grain, fattening lambs can be fed one to two pounds of potatoes per head per day. Ewes have no trouble in handling whole raw potatoes and up to lambing time can be fed from two to two and a half pounds per day along with good legume hay. After the lambing the daily ration of potatoes should be increased to about four pounds. It is claimed that the practice of feeding potatoes to ewes after lambing increases lactation to the point where a higher percentage of lambs are saved.

A word of caution should be added here regarding frozen, sunburned, decomposed, green and sprouted potatoes. Some authorities claim that such tubers contain dangerous quantities of a poisonous material called solanin and should, therefore, not be fed to stock. Davis, at Beltsville, says he's not sure whether solanin has this toxic effect or not. And Fausch says, "It is foolhardy to go out of your way to cause trouble for yourself, so I am not advocating feeding potatoes of poor quality. We have, however, fed quantities of badly rotted potatoes, also potatoes with long sprouts and potatoes which had been frozen and later thawed. In general, I think if a potato is good enough so a steer will pick it up and eat it, it probably won't cause him any trouble."

They're your stock, so take your choice, but don't say that solanin wasn't mentioned.

Comparative Values

Comparative feeding values for steers, as reported by the Minnesota station, ranged from 59.63c to 73.23c per hundred pounds when compared to barley at $1.50 per bushel, oats at 85c, linseed meal at $70 per ton.

The comparative feeding value of fresh potatoes is figured at approximately the following rates:

100 pounds of shelled corn equals 450 pounds of fresh potatoes.

100 pounds of alfalfa hay equals 300 pounds of fresh potatoes.

100 pounds of corn silage equals 100 pounds of fresh potatoes.

100 pounds of mixed grain equals 350 pounds of cooked potatoes when fed 2 to 1 with the grain to swine.

28 pounds of alfalfa and 12 pounds of barley equal 100 pounds of fresh potatoes for lamb feeding.

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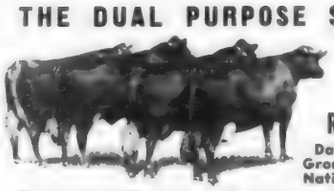

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This group exhibited from herd that averages over 325 pounds butterfat per year. Cow at extreme left is Grand Champion with four records, averaging 8496 lbs. milk, 389.6 lbs. butterfat.

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THE RED POLLS

(Continued from page 67)

beef production. He follows much the same type of cow-calf plan so popular in Kentucky and Tennessee, in that he sells the calves right off the cows in the fall, roughing the cows through the winter until the next calf crop comes along.

"I can keep two Red Polls on what just one big dairy cow will eat," says George Rice. And his cows are always in good flesh, even at the tag end of winter when most stock begins to look about ready to throw in the towel.

Crossing Brahman with Red Polls, T. W. Patton, of Cedar Hill, Texas, was well on the way to developing a type of beef cattle well adapted to southern grazing. He called these Southland Cattle. Recently he sold his entire herd to J. D. Kirven, of Waxahachie, Texas, who is carrying on the strain. Patton's breeding plan was to use a gray Brahman bull on Red Poll cows for a first cross; the gray was used because of the exceptionally good individuality of this particular bull. The resulting heifers were bred to a red Brahman bull for the second cross and the heifers from that breeding were finally to be mated to a Red Poll bull.

Patton realized in starting this breeding pattern that the desired results would be slow in coming; so, early in the experiment, he gave southern ranchers this advice:

"The straight Red Poll-Brahman cross can't be beaten. It is easy to handle. Ideally a good Brahman bull used on good Red Poll cows is the thing. The only objection I have to doing it the other way around is that it involves waiting for the cross-bred heifers to come into production before the advantage of the Red Poll's milk production is made evident. Red Poll cows are difficult to obtain, though. So I would advise the commercial cattleman who is using pure-bred Brahman cows to get a good, registered Red Poll bull and start using him. The results will be surprising. . . . I could stop on this first cross and top anything that I have seen in beef cattle for this part of the country."

While Red Polls are quite able to make themselves at home in the severe winters of northern Minnesota, they also thrive in semi-tropical climes. They are a very popular breed in South Africa and are becoming well thought of in the West Indies, where they are also being crossed with Brahmans.

H. Keith Coxe, who manages the Reynolds Farms at St. Ann, Jamaica, B.W.I., says that twenty-five years of experience have convinced him that in his part of the West Indies nothing is more profitable than a Red Poll-Brahman cross. He likes a cross that is 3/8 Brahman and 5/8 Red Poll. "In a pure bred herd," he says, "as time goes on the animals get smaller and

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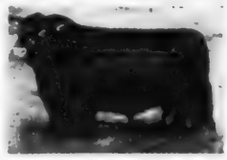

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smaller in the tropics. Our answer to that is to breed Brahman into them to keep up their weight and give the necessary resistance to hot climate and the various pests which attack them.

"What makes the Red Poll-Brahman so attractive is that it is a splendid dual purpose animal, giving, for the tropics, a good supply of milk, and rearing calves without any trouble. Recently we sold steers of between 30 and 36 months of age which killed out at over 600 lbs. W.D.C.W. and dressed out between 57% and 58%. It must be borne in mind when comparing these weights with those obtained in the north that these steers are fed on grass only and get no grain."

For the general farmer who is interested in getting into Red Polls, a choice of three plans of management is suggested. The first is to milk all the cows and raise the calves by hand; this method demands careful attention to calf feeding. The second method is to milk half the cows and double up the calves on the other half. This provides a steady cash income from the milk and gives the calves a chance to develop well. Red Poll people say a cow that can't raise at least two calves isn't worthy of the name. The third system is a regular beef herd type of management in which the calves follow the cows on pasture. Warning is here given that this may result in some spoiled udders unless the herd is closely supervised and the heavier producers milked out until such time as the calves can take all the milk.

The Prices Are Right

One of the nicest things about Red Polls is that a man doesn't have to be a millionaire to get into the breed. The market for Red Polls is characterized by stability and also by a complete absence of those fantastically high individual prices recorded in some other breeds.

The average for the eleven biggest Red Poll auctions last year was $390. The top bull and the top cow sold at auction brought only $870 each, while the top bred heifer sold for $725. The all-time modern auction tops are $1200 for a female and $1550 for a bull.

This means that Red Polls, even the best of them, are still within the farmer's price range and that as a breeder he can rely on good solid averages in disposing of his surplus stock once he has become established.

The Red Polls seem to have definitely made a place for themselves in American agriculture and those who are working with them day in and day out are ready to agree with old John Schmiesing that "the longer you have them the better you like them."

THE AUTHOR: Charles Koch, a regular contributor to *The Farm Quarterly*, is a teacher, writer, and farmer. A graduate of Xavier University, he did graduate work in agricultural economics at Ohio State University and later taught there. At present he is teaching at Mount St. Joseph College. A former Editor of *The Blood Horse*, he still writes for the lovers of fast horses as well as for a religious magazine, *The Shield*.

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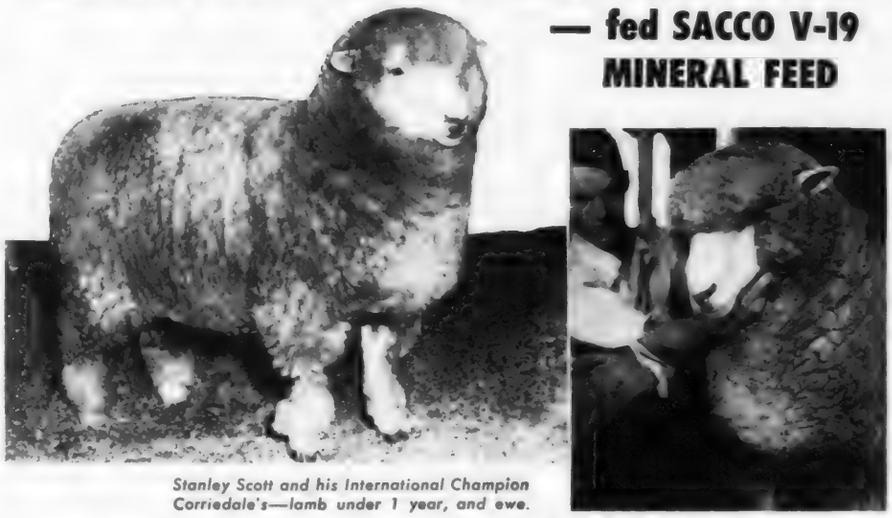

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THE BIG PRINT GIVES

(Continued from page 55)

one policy is written is because an individual has more than one friend in the insurance business. Some YMCA's, churches and community buildings will have as high as 30 or 40 policies on them. Every member who is an insurance agent wants a piece of the commission.

6. *IS THE POLICY WRITTEN IN YOUR NAME?* Building insurance policies don't come with a farm like a tail with a dog—they must be written in the name of the *legal* owner. The insurance policy is a contract, and because it is a contract, both parties must agree to any change, or the changes made are not binding. Thus, if you sell your farm to the man across the road, and when the deal is completed, casually hand him the policy, you are not giving him anything more valuable than a piece of paper. If you're the legal owner of your farm, and your name doesn't appear on the front of the policy, or on an endorsement which assigns it to you, you'll be in for a shock when you try to collect after a loss.

7. *INSUFFICIENT INSURANCE:* Most city dwellings are near a fire plug and in the event of a fire a phone call summons a fire truck that makes a run over normally cleared city streets. Because the fire department can be at the fire in a matter of minutes, you seldom hear of a town dwelling being entirely destroyed by fire. With a farm building, it's a rare fire that doesn't result in a total loss. City dwellings are rarely insured for anywhere near the amount a farmer would carry on his dwelling. At that, a farmer

There goes the old barn!

seldom places the amount of insurance on his building which he actually needs. You can't build an $8000 house with $1800 worth of insurance. Labor and material costs have risen steadily, particularly since the Korean war. This increase in building costs, plus what the present inflationary boom has pumped in, all tends to increase the value of your older buildings. If the values in your insurance policy haven't kept pace with the value of your buildings, you may be facing a day of reckoning. If you are going to pay for insurance, see that you have enough. It is much pleasanter to collect from an insurance company after a loss than to borrow the money necessary to rebuild.

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HOW TO MAKE MONEY IN THE COUNTRY

Authorities say there's no magic to making a good living wherever we want to live. The only secret is to recognize the opportunities. Everyone has watched somebody make a lot of money from an idea we should have grasped ourselves. Only, the other fellow saw the chance while we didn't.

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Insurance companies prefer not to insure a building for over 80% of its value, mainly because they are so painfully aware of the probability of a total loss once a fire starts. They want a farmer to have a very real interest in either preventing a fire or making every effort to put it out once it starts.

Because the farmer has only a general idea of what he needs in the way of insurance, the agent usually takes the initiative in determining how much insurance should be placed on the buildings. But the farmer ought to figure this out himself—he should "buy" the amount of insurance he needs and not have it "sold" to him. If a farmer should ask for an abnormally large amount of insurance he might not get all he wanted, but he would come close. If a farmer definitely states what he does and doesn't want, even if on the surface his demands are not in line with the facts, there is every chance his agent will go along with him, mainly because insurance is so competitive.

Farmers are often reluctant to change the values they place on their buildings, which explains why so many farm buildings are badly under-insured. If a farmer has been carrying $2000 on his barn since before the war, he is often reluctant to increase it. It is easy to continue along the old lines, and so as not to antagonize a good customer, the agent will go along with him. Policies as a result are often renewed from term to term with little or no change. Evaluating a building is probably a difficult job, but for insurance purposes the farmer, because he is the one paying the premium, can, if he will, pretty much put his own value on his buildings. Whether it is good or bad, the insurance business is so competitive that if one company won't go along with him, another one probably will. If he wants it, he probably can get pretty nearly full replacement cost: and he can usually collect even though he may be over-insured. This can be over-done, though the odds are with the farmer.

In determining the value of a building on your farm, figure out what you would replace it with if it were destroyed. If you have an old barn that you are using as a machine shed, that barn is worth, to you, roughly what it would cost to build a machine shed. "Utility value" and "replacement cost" are the only guides to follow in appraising your building. They are your buildings and it's your policy, paid for with your money, so *you* decide how much to place on the buildings, not the agent. Your agent will give you his suggestions, but the chances are good that if you know the amount you want he'll go along with you.

8. *CORRECT PREMIUM CHARGE:* If there is something about your farm that reduces the possibility of a fire, or would help in fighting a fire once it starts, you probably can buy your insurance cheaper than your neighbor who hasn't these advantages. Individually, or

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No more wasted time, labor, money! The Scythette does the job smoothly whether on rocky, rough ground or underwater—reaches all those "hard-to-get-at" places. Easy to handle because it weighs only 24 lbs., economical to operate because it runs many hours per gallon, streamlined because it features aluminum construction and a 20" cutter bar. Where ordinary cutters fail, the Scythette succeeds.

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Solves Water System Problems

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☐ Extra deep well system
☐ Deep well turbine

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CITY _____

GET A SURE STAND OF GRASS WITH LESS SEED

THIS BRILLION Sure-Stand Grass Seeder and pulverizer seeds grass within the top half inch of a fine, firm seedbed . . . gives every seed an opportunity to germinate and grow into the grass you want.

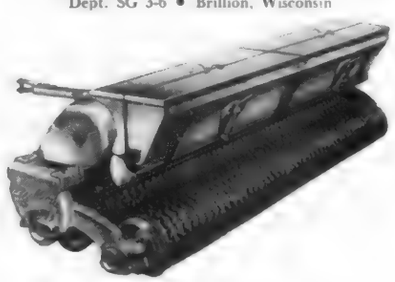
Note how this seedbed is free from lumps which have been crushed by the front roller. A metering device accurately counts out the seed.

After the seed is dropped on the pulverized seedbed, a rear roller covers the seed to a maximum depth of ½ inch, and gently packs the soil around it. The result is a uniform seeding at the rate desired—no wasteful overseeding — and the seeds themselves are in contact with moist, nourishing soil where they can germinate quickly.

The Brillion Sure-Stand Seeder does this all in one simple operation — one time over the field. If you are broadcasting seed, or seeding with grain drill, which allows seed to fall onto rough ground or open spaces between lumps, it will pay you to get the Brillion story.

Farmers report saving enough seed the first year to pay for a Sure-Stand.

BRILLION IRON WORKS, INC.
Dept. SG 3-6 • Brillion, Wisconsin



Brillion
SURE-STAND SEEDER
"TUCKS EACH SEED TO BED — IN THE TOP HALF INCH OF SOIL."

in combination, the following credits may tend to make your insurance cheaper:

1. Approved roofing. Practically anything but wood shingles will reduce the premium for the insurance on the dwelling.
2. Furnace instead of a stove.
3. Lightning rods correctly grounded.
4. Masonry instead of frame construction.
5. Availability of fire department. Water supply.
6. Spark arrestors.

There is nothing uniform about these credits. They vary by states and by insurance companies. Look over your buildings and see which of the above applies in your case and ask your agent if they were considered when your policy was written. If some credits were overlooked, nine out of ten agents will be tickled to death to point them out to the company.

Take No. 5, "Availability of fire department." Normally, an insurance company requires that the dwelling be equipped with a telephone, be on an all-weather road with an all-weather entrance to the farm, and have adequate water available for use of the fire department.

The schedule below indicates credits allowed by a typical company which offers a 3-year rate of $17.00 per $1000 without credits.

CREDITS

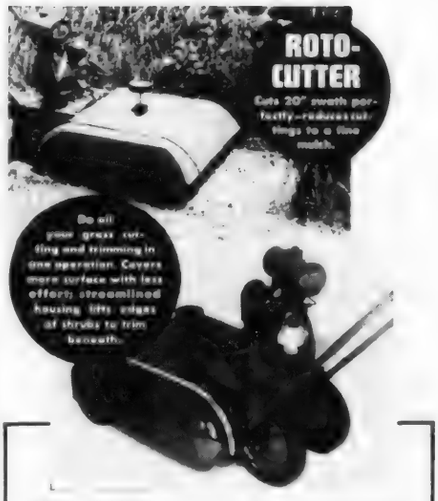
1. Fireproof roof	$1.50
2. Lightning rods	2.00
3. Furnace	1.00
4. Spark arrestors	1.00
5. Fire department service	1.50
TOTAL	$7.00

Thus, the credits reduce the premium to $10 per $1000. A $5000 policy on dwelling would cost $85.00 with *no credits;* the same policy, *with credits,* would cost $50.00, a saving of $35.00.

9. *"FINE PRINT" EXCLUSIONS:* There is nothing uniform about these either, but here are some standard exclusions recognized by most companies:

1. Roll roofing. If this is to be insured against loss by wind you may need a special endorsement.
2. Heat lamps for brooders. These probably will void your insurance on that building if you don't have a special endorsement.
3. Storage of gasoline. One gallon of gasoline has the explosive force of 83 pounds of dynamite. Most companies state that gasoline must be stored at least fifteen feet from buildings, or the insurance on those buildings is void.

The customary procedure on loss adjustments is to estimate the cost of repairs and settle on this basis. If a loss was caused by wind and consists of quite a bit of minor damage—some shingles blown off, a couple of windows broken and pos-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Cuts 20" swath perfectly—reduces cuttings to a fine mulch.
Do all your grass cutting and trimming in one operation. Covers more surface with less effort; streamlined housing lifts edges of shrubs to trim beneath.

ROTO-CUTTER mows every blade in tall grass, weeds, plantain, etc.—cuts forward, backward, sidewise in arc. Easy to work close up to trees, shrubs. Versatile; cutter easily replaced with Roto-Hoe; motor used as portable power unit. Roto-Cutter complete with 2 h.p. Lauson motor, $122. (Add Roto-Hoe unit any time—only $52 more.) Ask your dealer for demonstration; or write for FREE new illustrated folder giving complete facts. (Dealer inquiries invited.)

ROTO-HOE & SPRAYER CO.
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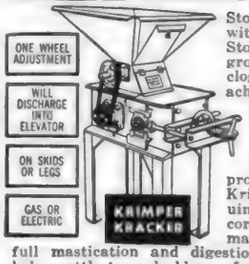
Home Crimp Your Grains CUT FEED COSTS 20%



Stop wasting grain with hammermills. Stop feeding dusty, ground grains that clog nostrils and stomach, are unpalatable, cause scrubs, bloat and tail-enders. Now roller-crimp your grains for greater feeding profits. New low-cost Krimper-Kracker genuinely roller-crimps corn, oats, barley, maize, wheat, etc., for full mastication and digestion. Full absorption helps cattle to early bloom, faster growth on less grain. Crimping makes grains bulky, doubles volume, makes 4 bushels do feeding work of 5.

PAYS FOR ITSELF *QUICKLY!*

Krimper-Kracker's low cost will amaze you—extra profits from one season can pay for it. A size for every farm—¾ to 25 HP, 4000 to 30,000 lbs. per hr. Requires only 1/6 the power of hammermills. Wagon box loader optional. Write for free literature and prices today! AGENTS! Honest, steady profits. Write for territory.

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NEW HAMPSHIRES

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sibly some damage to the siding—the insurance company would estimate the cost of material and the cost of the labor, depreciate the shingles a little and make an offer of settlement. Because it is so extremely difficult to predict in advance what the actual cost of repairs will be, this method is not always so good from the standpoint of the farmer. Insurance companies like it because they can tidy up their records and not have on their books a large number of unsettled claims. They also know most estimates are below actual costs. From the farmer's standpoint the best method is to have the repairs made, know exactly what the costs are, and from these actual figures work out the final settlement. In practice, depreciation is used regularly on shingles, to some extent on sidings and paint, and to only a minor extent on the balance of the building. Several states have what is known as "a valued policy law." Legislatures of these states indicated their belief that if an insurance company is so anxious to obtain a premium that they will over-insure a building, that company should be forced to pay the full amount carried in the event of a total loss. One can imagine some of the fantastic claims that have been paid. One company reports a recent payment of $1500 worth of insurance on a $300 building.

LIFE goes on after a farm fire; Elsie must be milked and the pigs fed. A fire is always a sorry event, but there is some consolation in full insurance coverage.

For farmers who will suffer a fire or wind loss in the next twelve months, fifteen minutes checking their policy against the nine points listed above, could financially be the best paying time they ever spent. Fortunately, errors in a building insurance policy are easy to spot and easy to correct—before a fire starts. A well written building insurance policy can put a farmer back in business again in the event of a loss, while a poorly written policy will let him down at the very time he needs it the most.

Crops, Livestock, Liability

CROPS: There is no yardstick for measuring it, though insurance companies are convinced that two-thirds of the farmers are confirmed optimists while one-third are gloomy pessimists. Some people say a farmer probably has to be an optimist or he could never stand the strain of being a farmer. According to insurance company figures the optimists see no need for hail insurance while pessimists usually buy considerably more than is necessary. No one has come up with the exact answer yet, though someplace in between the two extremes is where the truth lies.

There is no mathematical formula that will tell a farmer whether or not he should insure his crop against loss by hail. Some general guides have been developed, though, that might help in solving one's own problems.

Don't try to out-guess hail; you can't win. If you are going to insure, make that a regular practice. Don't insure one year and not the next.

The man who really needs hail insurance is the one with sizeable expenses to meet and only the money from the coming crop to handle them. Interest and principal payments, seed, feed and living expenses — all of these must be paid whether or not a crop is raised. Hail is only one of the risks a farmer faces and it shouldn't be minimized or magnified out of proportion to its importance. The only thing that separates this risk from the others the farmer faces is that this is one risk that, for a premium, he can largely eliminate.

If a farmer does decide to insure, the next step is to figure out how big his policy should be. A logical method that is coming into play more and more is the "fixed expense" plan. Rather than try to predict in the Spring what a crop will be worth by harvest, many farmers determine first what their expense for the season will be and then write a hail policy for this amount. During this season, if crop prospects warrant it, this policy can be increased. This plan works and it fits in nicely with the unusual characteristics of hail insurance policies. Hail insurance, strangely enough, costs no more early in the season than it does at the last of the season. Therefore, if a man is going to

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8 h. p., 48" Wheelbase. Compact; Well Balanced for Easy Handling.

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Tested and proven for Almonds – Walnuts – Figs – Pecans – Tung Nuts – Filberts – Apples.

The Goodwin Pick-Up saves you worry on labor AND saves you money. Rugged practical construction eliminates operation delays and repair costs.

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- Running water available all year 'round.
- Reduces fire hazard.
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- Over a million Vogel Frost-Proof Closets and Hydrants have been sold.

The handle in this position shows at a glance that the water is positively shut off and is your guarantee against freezing and leakage.

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Will never freeze when properly installed. A great convenience when installed in an out building or on a rear porch of a residence.

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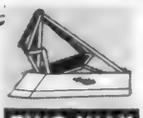

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insure anyway, he might just as well buy a small policy early. The average policy cannot be cancelled once it is written. You can add to your policy but you cannot take away from it. In this respect hail insurance is pretty much a one-way street. If a farmer starts his policy high he can't lower it, but if he starts it low he can always add to it as crop prospects warrant.

Altitude appears to be one of the major factors influencing the amount of hail that will fall in any given locality. Moving westward from Illinois, the land rises steadily to the mountains and hail rates rise steadily to the sky. From a premium charge of $1.50 for each $100 insurance in Illinois, the rates go up to $18 a hundred

THE BARK shows the path of death.

in western Nebraska and even higher in some of the mountain states.

In summary, hail insurance is exactly like any other kind of insurance. It works best when it is "bought" rather than when it is "sold." Determine whether or not you are going to insure, and if you do plan on insuring, buy your insurance like you would bananas—know what you want.

The federal crop insurance policy is the only "all risk" policy available for growing crops. It is the only place you can get any insurance against flood, wind, rain, insects, drouth, animals, etc. Commercial insurance companies are set up to insure only against loss by fire and hail on growing crops. Through Lloyds it is possible to insure against some other specific items, though such policies are rare and hardly worth considering. Briefly, the Federal Crop insurance program operates on an "average" basis—an average return per acre in either dollars or bushels is computed for each county. This average is usually quite low. If through flood the farmer would lose 20 acres of corn, he could turn in a claim for this loss. If, however, the rest of his corn produced enough to put him over the "average" he couldn't collect even though he actually lost 20 acres of corn.

LIABILITY INSURANCE: It used to be that when a man fell down he picked himself up, brushed off the dust and apologized for being so clumsy. The normal rule today appears to be to lie on the

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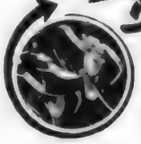
M-E ROTARY TILLER

New Economy Model EC12-C2



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Here's Rotary Tillage at its finest — controlled soil aggregation that can be tailor-made to your soil and crop! All models have 2 rotor speeds, plus 4 forward speeds on B models, 2 on Economy Model. Plug-in attachments for year 'round jobs also available for B models. See your dealer or write today — enjoy better crops, better soil this year!

Model B12-C3

Model B16-W4½

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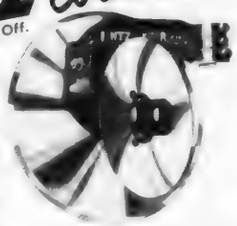
Winner of
1951 NATIONAL PLOWING CONTEST
SAYS:

"I used a **LANTZ** *Coulter"*
Reg. U. S. Pat. Off.



Lantz Kutter-Kolter

Yes, Mr. Drake used one Lantz Kutter-Kolter on his contest plow...he uses them on both his 5-bottom and 3-bottom farm plows. For over 14 years, numerous plowing contests and thousands of farmer users have been proving that Lantz 2-bladed Coulters help do a better job of plowing . . . once over. Your plow will cut and cover more trash with Lantz 2-bladed Coulters than with any single-blade coulter. Helps fight corn borers; cuts plowing time; saves manpower.

New Model "B" with cross-over scissor action.

Where trash is no problem, the Lantz Kutter-Kolter may be used as a single-blade coulter by removing the disc blade. Best all-purpose coulter made; more for your money.

Write for literature and name of nearest dealer.

LANTZ MFG. CO., INC.
Dept 52 Valparaiso Indiana

ground and groan while friends round up witnesses and phone for a lawyer. Because of this trend, farmers are finding themselves involved in an increasing number of personal injury and property damage claims. Lawsuits are fought today over matters that ten years ago were settled over a glass of beer. The steady increase in the amount and complexity of machinery, plus the tendency of farming to change from a way of life to big business, has had a lot to do with this. Because he realizes the consequences of a law suit, the average farmer wouldn't step in his car without adequate liability insurance. Though his farm doesn't go down the highway and through traffic like his automobile, it can still cause him considerable trouble through broken fences allowing livestock to wander, water washing from one farm to another, drifting weed spray, tramp dogs, falling ladders, concealed holes, and just a plain ornery neighbor.

If you had to be in the wrong to be sued. there wouldn't be too much to worry about. Unfortunately, any one can hire a lawyer, and collect for actual or alleged injury or damage. Preparing a defense against such claims takes time and is expensive. Whether or not liability insurance is worthwhile is debatable. If a farmer suddenly finds himself facing a suit, a liability policy would in his mind be one of the smartest things he ever bought. It's a comforting feeling to know you have the insurance company's attorneys backed up by the insurance company's money if you should ever need them.

The schedule below reflects the liability limits and the one year premium for three standard liability policies. You will note the similarity to the type of policy you have on your automobile:

160-ACRE FARM

Limits

Injury or Death To One Person	All Injuries or Deaths From One Accident	Property Damage	1-Year Premium
5,000	10,000	1,000	8.55
10,000	20,000	5,000	10.36
25,000	50,000	5,000	11.41

Many companies write a "comprehensive" policy for farmers. The one year premium for this is about $14.00. Liability limits are $10,000 for everything, personal injury as well as property damage. This is an exceptionally good policy. It is written on the farmer as an individual and covers that farmer and his operations. He will be protected against the nocturnal forays of his dog, the extra-curricular love making of his bull, and the damage his pigs do in his neighbor's clover.

The types listed in the schedule above protect the farmer only should his farm be the cause of injury or death to another, or cause property damage. For the farm operator the comprehensive policy is best; for the absentee owner the more limited form reflected in the schedule above is sufficient.

Claims filed under this type of policy run the gamut of bad luck. A small tractor used on a golf course to pull a battery

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. . . won't rot, rust, corrode
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Engineered for every use . . . pure, cold water or corrosive liquids, suction or discharge, wells or distribution lines. Smoother walls decrease build-up of bacteria-bearing film.
Yardley Plastic Pipe is made in both rigid and flexible materials in a full range of pipe and tubing sizes ½" through 6". Complete line of standard fittings and adapters.
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a type for every purpose:
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GUARANTEED
AGAINST ROT, RUST AND CORROSION
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DOES THE WORK OF 2 WITH WADE'RAIN

THE Magic of Water
...WHEN YOU NEED IT!

BOOSTS PRODUCTION just as definitely as if you were farming more land. WADE'RAIN increases yields, lets you laugh at drought, improves crops and pastures. Proven superiorities in design — greatly increase ease of irrigating — reduce manpower requirements.

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Self-Draining for Faster Moving. Self-Sealing. Can't Blow-out.

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of lawn mowers broke loose, plowed through a fence and marched across an 18 acre field of oats. The oats were about 5 inches out of the ground. The insurance company covering the golf course settled with the farmer for $516.00.

In Massachusetts about 3 years ago a bull escaped from the truck in which a farmer was hauling him to market. After wandering around for some time he walked into a glass and chinaware shop. Apparently he hadn't heard what a bull does in a china shop, for he didn't even crack a teacup, and was finally led away. If damage had been done, even for a bull in a china shop, the farmer's liability would have been covered.

Last winter the Farmers National Management concern in Omaha collected $75 when the eight-year-old son of a neighboring farmer burned down an old building on a farm the company manages. The boy's father had a liability policy and this liability policy paid the claim.

LIVESTOCK: Fire, lightning and theft are the major hazards to be covered in your livestock policy. If your agent tells you the policy also includes windstorm, hail, riot, aircraft falling and vehicle damage, you are probably paying for more protection than is actually needed, though that's only one man's opinion. Insurance companies can show you that they've paid losses on these fringe benefits, but from the farmer's point of view "all risk" policies don't bushel out over the years. "Transportation" policies on livestock being shipped to market and "life insurance" policies on valuable blooded animals are something else. We're considering here only livestock normally kept on a farm or ranch for dairy or beef purposes.

Your normal livestock policy—the kind written by 90% of farmers who insure, protects against losses by fire, wind and hail. Such a policy will be written to include all the animals in which the farmer is interested, cattle, hogs, sheep, horses, etc. An "all risk" policy is expensive; the premium is computed at around 7% of the value of the animal. Such a policy is sometimes written for selected animals, which must be examined and approved by a veterinarian. This policy will insure against death by any cause. Hogs, sheep, goats, dogs and fur bearing animals are excluded from the "all risk" policies, but they can be insured against loss by fire, lightning, tornado, transportation, etc. A "mortality" policy can't be written on them.

THE AUTHOR: H. L. Tinley is a graduate of Creighton University (1940), took additional work in mathematics at Iowa State College and the University of Iowa. He spent two years before the war as an insurance adjustor in Boston, Washington, D. C. and Minneapolis. He was in the army for four years, spending two years as a staff officer in Europe with General Eisenhower. He has been with Farmers National Co. since the war, heading their Insurance Department. Mr. Tinley buys a quarter of a million dollars worth of building insurance a month for the 1600 farms the Farmers National manages.

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SAVE CROPS Water any field quickly at low cost with OK Champion pipe. Take water from well—lake or stream. Save crops—greatly increase yields. Get better grade products. Two men can move and re-connect ¼ mile OK Champion Pipe in 30 minutes. Quick connecting, flexible couplings. Send for FREE Circular.

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PORTABLE IRRIGATION

COUGHS DUE TO COLDS

among horses, mules, cattle, sheep and dogs call for treatment with SPOHN'S COMPOUND. A stimulating expectorant. Acts on throat and bronchial tubes to hasten relief. Used by world-famous horsemen for 55 years. At drug stores, or direct, postage paid—75c and $1.50. Spohn Medical Co., Box 14, Goshen, Ind.

SPOHN'S COMPOUND
FOR COUGHS DUE TO COLDS

FEELING FOR TURTLES

(Continued from page 48)

I always wear only trunks and tennis shoes when feeling for turtles. I wade along the banks and feel as far as I can reach back in all of the mushrat holes and overhanging banks. There are times when mushrats will attack your hand: they can give you bad bites. I feel around in all tree roots and drift piles and old logs: when a turtle is found I feel around the shell until I find the deep notches in the shell over the tail, then I get hold of the tail and out they come. If they are very large I use a gaff hook on them. If a turtle should bite you they will sometimes release their hold in a short time if you push their head back in the shell with the gaff hook, otherwise you will have to cut them loose or wait a long time: then they may not let go at all.

I never keep a turtle under six inches. Some may weigh fifty pounds or more: they are dangerous ones and get very nasty when gaffed and are hard to handle. It is wise to keep your hands away from their feet as they have long sharp claws and can cut you to the bone and cause a bad wound. I don't know of snappers clamping on you with the shell: their shell is not hinged like that of the box turtle. Therefore there is no danger of being clamped on by the shell.

Catching turtles on lines is, I believe, the most popular way of taking them. In this way you run no risk of getting bit with them. Personally, I use mustad hooks No. 190 on ten feet of 30-lb. test cutty-hunk lines with five-inch copper wire leader: green line is much better than white as it does not show like the white and is not likely to be seen by any one passing by. If a catch is made do not try to horse them out as they are likely to snap their head and break the line or hook, and get away. Always locate the turtle and reach in and get them by the tail or with a gaff hook: they are not likely to snap the head as long as they are under water. But the moment their head clears the water they snap the head up and back and can break a big hook very easily. Turtles may be carried in a gunny sack while hunting them.

Turtles may be sold to a great many places in the larger cities, fire departments, lodges, American Legions, sporting clubs, restaurants, hotels, markets where sea foods are sold. Good singles are bought by the individual who does not want more than one. Any amount of turtles can be kept indefinitely in pens made of heavy wire netting; ten-foot square will take care of twenty-five or thirty turtles very nicely. The pen must be built in water deep enough so that the turtles can completely submerge, as turtles cannot eat if not submerged. Most any kind of meat will do to feed them; some place should be provided so they can get into the dark during daylight. They can then be sold as you get your orders; small ads in local papers will usually sell all you can get. Most every one lives within a hundred miles of large cities and should not have any trouble selling all they can catch.

I sell most all I catch live weight for forty cents a pound. I do not have to dress very many; sometimes some buyers want them dressed. Here is how I dress them. I first get them to take hold of a pair of pliers, then I pull their heads out as far as I can and cut them off close to the head. I then hang them up and let them bleed for a couple of hours. I then scald them till the dark skin slides off easily leaving the skin a creamy white. Then I cut the feet off with a pair of snips, then the bottom plate is cut loose from the upper shell and removed, the entrails are then taken out leaving only the meat and shell to be separated, which is easily cut out. The loin cannot be taken out, so I cut the spine and the two loin strips out with a cleaver; the skin may or may not be taken off. Personally I never take the skin off as it retains all of the flavor in cooking. All scent glands are removed as is the fat which has a strong taste. I deliver live turtles with the car; they may be put in gunny sacks or left loose in the back of the car. For dressed turtles I have an army food container with six food compartments with clamp on lids and space for fifty pounds cracked ice. This will keep the meat in good shape a long time. I get up to eighty cents a pound for them dressed.

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Roasted Turtle on the Shell

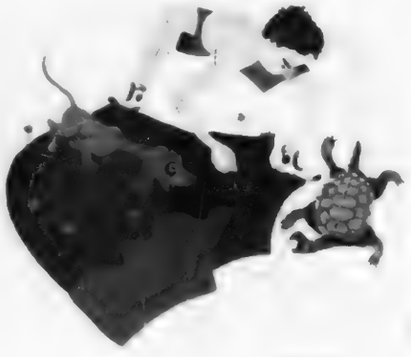
Dress turtle as instructed, only leave bottom plate attached on one side, remove entrails, wash good two or three times, stuff with dressing, sew on bottom shell and roast until well done. Dressing may be any kind the individual may desire. A few strips of bacon may be laid over the bottom plate to keep it from roasting too dry.

Fried Turtle

Take pieces of turtle, dry them, dip into egg batter, roll in cracker meal or corn meal, season to taste, and fry in very hot deep fat.

Baked Turtle

Take the desired amount of turtle, place in roaster, place strips of bacon over turtle, add a couple of bay leaves, ½ teaspoon salt, ⅛ teaspoon cinnamon, 1/16 teaspoon each cloves and nutmeg. Start your oven at 325 degrees F. or slow. Put meat on rack in roasting pan (if you are without proper rack, set meat on lid of shortening can with holes punched in it), lay bacon strips and bay leaf on top, season with salt and pepper, heat the apple juice and add the spices; every fifteen minutes baste turtle with this tantalizing mixture and see what a flavor it gives the turtle; bake till turtle is tender.



I will not list turtle soup as most every one has a different way to make it.

The Turtle Gaff Hook

I make the gaff hook from 5/16 drill rod, ground down to 2 inch long and three-edged. Taper on one end of rod to long slim point. The hook should be 2¼ inch long, 2¼ inch wide from point to shank. Bend shank back so point sets at an angle; bend should be made directly across from point; the flat side of the point should be on the inside of the curve; the extreme point should have a very mild bend out from curve; rod should be threaded and screwed on. Handle like that of screw driver is excellent. The complete gaff is eighteen inches long. Hone edges and point sharp after tempering. A gaff like this will easily cut through a turtle shell.

AUTOBIOGRAPHY OF THE AUTHOR: I was born near the village of Clinton, Ohio, in Summit County, in the valley of the Tuscarawas River and the Ohio canal in August, 1905. My mother and father separated when

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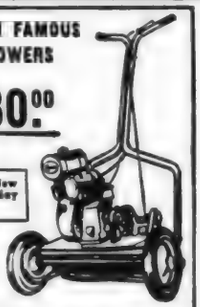

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I was one year old; my grand parents took over the job of raising me. They were poor people, making their living off a little five acre plot and a meager living it was. They could not give me an education so about all I know came the hard way. At the age of five I caught my first muskrats. My grandfather had three old Newhouse traps; he would set them for me, then I would carry them to the creek or township ditch. My first catch was two muskrats out of three traps; one was drowned and my old dog killed the other. I took them home, not knowing what they were. My grandmother told me they were muskrats. She skinned them for me and stretched them. I received a dime each for them; that was when the trapping bug first bit me. I then learned the ways of the wild things fast. I didn't care for the so-called sports that they have at school like baseball, football and all other games the few friends of mine would go for. My sport was roaming the hills, woods, rivers, lakes. My transportation was an Old-town canoe. Many are the times that old canoe was the only home I had. I would sleep under it wherever night overtook me in all kinds of weather. I learned the ways of nature fast. I learned what wild things could be eaten safely and where to find safe water. Many are the wild plants, roots, barks, and mushrooms that nature provides for us who go to the bother to learn about them. I have eaten some things that are excellent, although most folks would starve before they would eat them. Some of the things I have eaten are, skunk, muskrat, coon, woodchuck, chipmunks, squirrels, fish, frogs, turtles, crayfish tails, red fox, black birds, starlings and rattle snake. The starlings and the fox were terrible; all the rest are excellent. At the age of fourteen I worked for my stepfather and another man on a farm. I didn't make but a little money. They were mean to me; worked me hard, long hours. Sundays I would leave early and come back late. I would roam the woods and learn more there. There was always ginseng or golden seal or some other kind of roots to make a little money with.

I have trapped and roamed over parts of the west and northwest. At the age of twenty I married a little half-breed Cherokee girl sixteen years old. We now have four children, two sons and two daughters, twenty-five, twenty-three, seventeen and fourteen. I now live five miles southwest of Loudenville, Ohio, Ashland County, in the valley of the Mohican river in what is known as the Switzerland of Ohio. I am now working in the Flexible Co. Bus plant. I still do some hunting, fishing and trapping. Fox trapping, turtle hunting, and snake collecting are my pet hobbies as are beekeeping, root digging, collecting old steel traps, and Indian relics. For what it may be worth to you I am one of perhaps a very few men in the United States that wear earrings in pierced ears. I came about this years ago when I had a migrane headache for thirty-four days without a letup. An Hungarian lady told me to pierce my ears and wear earrings. I only wear them while hunting or roaming the woods with my best girl friend, Mother Nature. It actually works.

CHARLES "PATSY" WEBB

THE UNINVITED GUESTS

(Continued from page 61)

3. Don't allow sows or pigs outside of farrowing pens until they are taken to pasture.

4. Then haul, don't drive them, to pastures that haven't been used by hogs for three or four years. This job is made easy by using a two-decker crate on runners. A sow can be put in the lower part and her pigs in the upper one for safe transportation of the whole family.

5. Keep the pigs in the clean pastures until they are at least four months old.

The Flat Worms

In addition to roundworms, cattle, sheep, and goats are also invaded by two types of flatworms, commonly known as tapeworms and flukes.

Cattle, sheep, and goats are also troubled by various kinds of trematodes or flukes. Most of these pests are leaf-like in shape, but some are cylindrical and others are conical. The commonest are two species that live in the rumen and two others that are found in the liver. The larger of the liver flukes may reach a length of four inches. Flukes are also capable of infecting swine, but cause the heaviest losses in ruminants.

Most types of fluke eggs pass from animals in manure, with hatching favored by water and warmth. The resultant larvae depend on snails for continued life and soon die unless they run across one.

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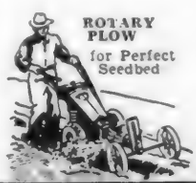

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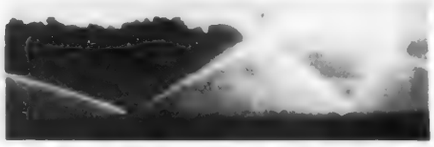

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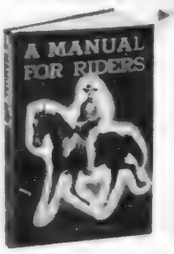

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In event of a meeting they burrow into the slow-moving shellback and live there until they reach the infective stage. They can leave the snail and form cysts which are attached to grass blades or sink to the bottom of water-holes. Animals swallow the cysts with food and water and flukes infestation results.

There is no practical treatment for affected animals. Preventive measures are chiefly concerned with the destruction of snails and the drainage of marshy pastures.

Tapeworms are commonest in goats and sheep, but cattle may also be seriously affected. The life cycle is much the same for all species. Eggs are passed with manure and then eaten by tiny grass mites found in pastures, particularly in swampy areas. The larval tapeworm is freed when the carrier mite is swallowed by animals, and promptly attaches itself to the lining of the intestines, absorbing nourishment from the passing food. The worm grows, and sections on the end become filled with eggs which drop off and pass out with manure. The so-called "fringed tapeworm" is sometimes found in the liver and pancreas as well as the intestines. Sections of tapeworms can sometimes be found in manure, which is a convenient help in making a diagnosis.

Affected animals act much like those infested with ordinary round worms: their coats get rough and they fail to do well. Constipation is the general rule, but diarrhea may occur in severe cases. Animals over six months old are seldom infested badly enough to show symptoms of sickness, but they often harbor tapeworms whose eggs are picked up by young stock.

There are two practical remedies, although both are highly poisonous and have to be used with extreme care. One is the Cunic preparation, mentioned earlier as treatment for removal of roundworms, and the other is lead arsenate. Cunic is best given as a drench in the same doses prescribed earlier for stomach worms. It is generally not advisable to treat lambs under two months old. Lead arsenate is best given in the form of pills so that animals can be individually treated with known amounts of the drug. The directions on the box should be closely followed. Strong animals over two months old will usually tolerate a dose of one-half gram. Preventive measures are the same as for control of round worms, particularly in regard to drainage and rotation of pastures.

Kidney Worms in Hogs

Swine are not affected by tapeworms, but in some of the southern states they may pick up a parasite commonly called the kidney worm. It is uncommon in the north because both the eggs and larvae are easily killed by freezing. These worms are found in the kidneys and urinary tract instead of the digestive system. Eggs are passed in the urine, and in warm, wet weather hatch out larvae in about four days. Eggs and larvae

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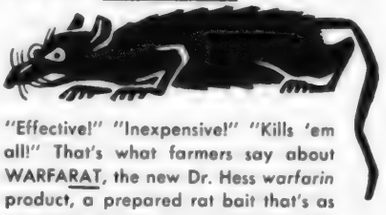

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alike may live for months in moist, shady places, but die quickly when exposed to drying. Although usually swallowed by swine, the larvae are able to enter the body by boring through the unbroken skin. In either case they generally reach the liver, where they burrow around for a while before finally making their way into the kidneys and ureter. However, larvae occasionally get on the wrong road and wind up in various muscles, blood vessels, and even the spleen and lungs. Females that manage to reach the urinary tract soon begin laying eggs to start the cycle over again. Other animals usually aren't affected, but kidney worms have been found in cattle that were pastured with hogs.

Symptoms are usually limited to loss of weight and failure to grow properly, although stiffness, and even death may result from heavy infestation. However, this worm causes the biggest losses through damage to the kidneys, livers, and other parts of the carcass, which makes meat unfit for human consumption.

There is no satisfactory treatment for kidney worms. The McClean County system of swine raising is the most effective control. In connection with this, it will be a good idea to pay a little attention to plans for hog lots. Recommendations call for plowing and leaving a hard bare strip of ground five or six feet wide along all the fences. Shelters and feed troughs should also be set in the middle of similarly bare and hard patches of ground, preferably at one end of the lot. Because swine have a habit of establishing a toilet in a particular spot, this spot should be dry and exposed to the sun, which kills both eggs and larvae.

Lung Worms

Cattle, sheep, and goats are also affected by a type of roundworm which appears outside the digestive tract. This is the so-called "lungworm," of which there are several different kinds. These parasites live in the lungs, where they lay eggs which are coughed up and swallowed with mucus. Larvae hatch from them in the stomach and pass out with manure. In about ten days they are able to move about and climb wet grass blades to increase their chances of being eaten by animals. After being swallowed they pierce the intestinal walls, enter the blood stream, and eventually reach the lungs to start laying more eggs. Under favorable conditions an entire life cycle may take less than a month. Larvae are easily destroyed by freezing. Sheep and goats seem to develop considerable resistance after a single attack, but cattle are sometimes infested year after year with no apparent lessening of symptoms. The lungworms of cattle evidently aren't dangerous for sheep, but the sheep lungworm has been found in cattle. Wild animals like deer may spread lungworms to cattle.

Young animals are particularly susceptible to lung worms. The most noticeable

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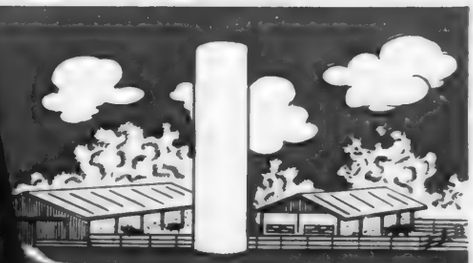

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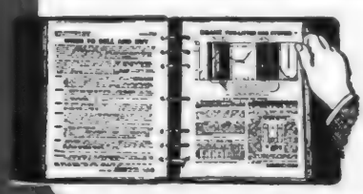

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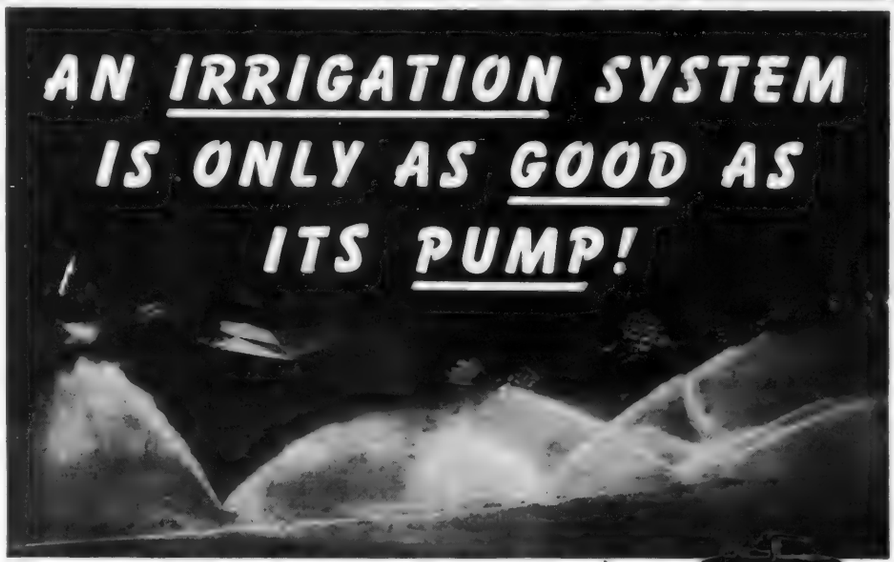

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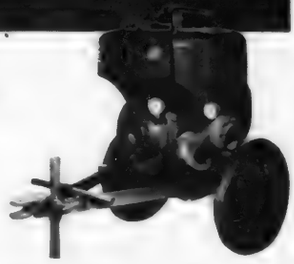
For help with your irrigation problem, write to Engineering Dept., Marlow Pumps, 249 Greenwood Ave., Ridgewood, N. J.



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more water at Lower Cost

Larger capacities at higher pressures on Deep or Shallow Wells. Plenty of water from depths to 300 feet or more.

Universal Pumps and Water Systems are engineered to meet tough, exacting demands of 24-hour service in home, farm and industry . . . 300 models . . . for complete satisfaction install a Universal . . . Injector or Centrifugal Pump.

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The Bostrom is used and endorsed by Schools, Extension Service & Individual Landowners everywhere.

Anyone can operate a BOSTROM Level by following the simple direction booklet included with each Instrument. We manufacture 3 models; Farm Level, Contractors Level, Convertible Level. All BOSTROM Levels are sold on the guarantee of satisfaction or money back. WRITE TODAY for literature, prices and name of our distributor near you.

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symptom is rapid loss of weight, but coughing is common, and in the latter stages there is apt to be foaming at the mouth, difficult breathing, and other signs of pneumonia. The head is often carried low to allow the escape of a persistent discharge from the nostrils. Diarrhea is common in sheep and calves sometimes wheeze like horses with the heaves. Animals that are lightly infested may recover in a few weeks, while others may die of pneumonia, either within a few days or after three or four months of suffering.

No satisfactory treatment is available, although various drugs have been recommended for injection into the nostrils. This is dangerous, because some of the drugs may cause death through suffocation. One owner reported 100 per cent failure in the use of chloroform for nasal injection. He killed the first four sheep he treated, and decided against using it on any more of the animals. Preventive measures, the same as given for control of stomach worms, are more practical. The isolation of newly purchased animals is particularly important in the northern states since larvae in pastures are destroyed each winter by freezing in such areas. Consequently, reinfestation is entirely dependent on carrier animals that are turned out on the ground in the spring.

Swine are also affected by lungworms, but they are of a different species with a different life cycle. Eggs pass out with the manure before they hatch, and these are eaten by earthworms. Larvae hatch in the earthworms and remain there until the earthworms are in turn eaten by swine. They then burrow through the wall of the intestines and eventually are carried in the blood stream to the lungs. These lungworm larvae are also important because they act as carriers of swine influenza. Lungworm eggs that aren't eaten by earthworms seldom live through an average northern winter, but larvae may exist for long periods in earthworms.

Affected pigs sometimes show symptoms of pneumonia, like calves and lambs infested with lungworms, but this trouble is usually caused by bacteria that invade the diseased tissues. The outstanding symptoms are usually stunting and general unthriftiness. A definite diagnosis is possible after a microscopic examination of the manure of suspected animals.

As in the case of lungworms in other animals, no suitable treatment is known and proper management represents the only effective means of control. Following the McLean County system of swine raising is probably the most practical method of doing the job. However, pasture rotation can't be depended on too much for protection, since we've already seen that lungworm larvae can live in earthworms for years at a time. Consequently, the ringing of hogs is advised in all cases, to prevent rooting and eating of earthworms. They should be kept away from old straw

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takes compressed air anywhere

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stacks and manure heaps, which harbor red worms, also hosts. A source of running water is desirable instead of ponds or troughs: the isolation of newly purchased animals is also recommended.

This about covers the common livestock worms. Omitted are rather rare ones such as gullet worms and various types of so-called "filaria." Harboring any kind of parisitic worm is expensive, and cures are more expensive. Vigilance in keeping these uninvited guests off a farm pays big dividends in time and profits.

THE AUTHOR: Dr. Jack Bailey is a veterinarian practicing in Wisconsin, the dairyland of America. Born and reared on a dairy farm in the same state, he has been interested in cows since he was old enough to walk to the barn to watch his father milk. He was a well-known herdsman for years before entering the Veterinary College at Cornell University. His reputation as a writer on farm subjects is only second to his reputation as a veterinarian. Readers of *Farm Quarterly* have learned that his articles are practical and sound.

RUNNING—HOT AND COLD

(Continued from page 87)

or the plumber who will install part of his system. In most instances these men are well qualified, through years of experience in farm areas, for providing the individual farm with a system suited to its needs. There are booklets available, too, at the county agent's office.

The amount of water used daily and the source of water determine the size

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When storms or breakdowns cut highline power to your farm, an Onan engine-driven electric plant will supply regular 110-volt power for lights, pumps, milkers, oil burner, freeze chest, etc. Can be equipped to start automatically when electricity is interrupted. Hooks up to present wiring. 1,000 to 35,000 watts, A.C.

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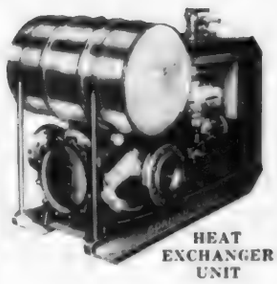
Gorman-Rupp pumps assure adequate water to irrigate this orchard.

Adequate water supply assures a larger and better quality potato crop.



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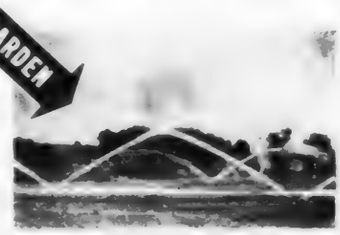
Gorman-Rupp Centrifugal Pumps never fail to deliver. They run day after day, entirely trouble-free. They assure **water when needed** with the least fuel expenditure.

Available in many sizes. GPM varies with pounds pressure. Ratings from 80 GPM at 75 lbs. to 1250 GPM at 125 lbs., or 3000 GPM at 35 feet.



Garden plot irrigated with water pumped from an adjacent pond.

Write for Irrigation Bulletin No. 9-IR-11

Gorman-Rupp Pumps — **THE GORMAN-RUPP COMPANY** — MANSFIELD, OHIO

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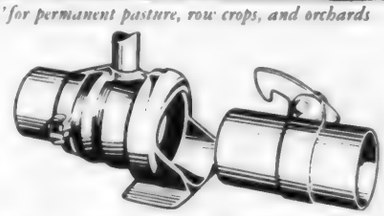

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Gentlemen: Please send me complete information on *Shur-Rane* Irrigation Systems and the new "Series 400" line.
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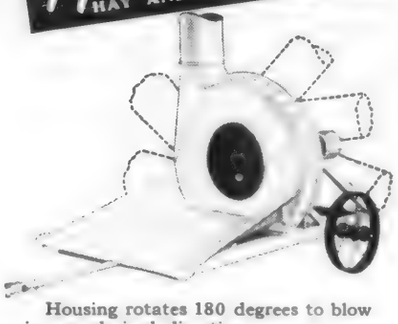
HAY AND FORAGE BLOWER



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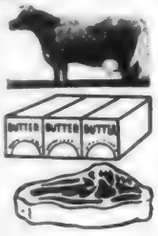
with TRULY DUAL PURPOSE
BEST in EVERY WEIGH MILKING SHORTHORNS



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pump to buy. A good rule to follow is to select a pump that will provide each day's supply of water in 2 to 3 hours pumping time. Water systems in which pumps are used are classified as shallow-well and deep-well systems, depending on the type pump. Shallow-well pumps suited for water levels to 22 feet below the pump are the jet, piston, turbine, and simple centrifugal types. All are automatic and may be used with shallow wells, cisterns, springs, lakes or streams. They may be mounted over the source of water or offset. The standard system furnishes pressure to meet special conditions. All except the turbine pump will handle water with a little sand or silt. All but the piston type decrease in capacity as the pressure increases and are quiet and non-pulsating in operation.

The piston pump works the same as most hand-suction pumps except it lifts and discharges water on both the forward and backward strokes of the piston. For delivering at high pressure, some recommend the piston-type pump above others. The straight centrifugal pump is simple, having only one moving part, the impeller. Suction lifts of six to eight feet are best with a maximum of 15 feet.

The centrifugal-jet pump, maximum suction lift 20 feet, is a straight centrifugal pump with a built-in jet which increases both pressure and pumping depth of the pump. It is simply constructed and requires no lubrication except the motor.

The turbine pump for shallow wells consists of a bronze disk mounted on a drive shaft and close-fitting case. The outer edge of the disk is slatted. As it rotates water is forced to move with it from the inlet to the discharge outlet.

A deep-well pump is used where depth of low-water levels is too great for the shallow-well pump, that is, over 22 feet. Like the shallow-well type, the deep-well piston pump has a uniform capacity and high efficiency. It is available for a wide range of lifts, but must be set directly over the well. Its normal operating pressure is 40-70 pounds.

The deep-well jet pump is really two pumps working together. It includes a shallow-well pump at the surface and a jet usually submerged in the water at the source. One pump lifts the water to the surface and the other forces part of the water into the pressure tank and part back through the return pipe to the jet. Most of these pumps are designed for well lifts up to 120 feet and the maximum discharge pressure is about 40-50 pounds. They do not have to be placed directly over the well.

The turbine pump has an impeller operated by a rod that extends from the top of the well to an electric motor. It is used for pumping large quantities of water from deep wells. Capacity of the pump usually ranges upward from 15 gallons

CUSTOM OPERATOR WITH FOUR GEHL CHOPPERS GETS AMAZING RESULTS

Clarence Lacey and his son Gerald of Wendell, Minnesota, say this about the performance of their Gehl Forage Harvesters:

"We filled 98 silos with four Gehl Choppers in 1950, and this last year due to shorter season, filled 83. We turned down enough silos in the fall to have kept another machine busy. Once a customer sees how fine cut and uniform Gehl-cut silage is, he is a steady Gehl customer.

"Hay chopping is increasing in popularity. Now with the new Gehl Mower-Bar, you can take it straight without swathing or danger of rocks. We get by with a minimum of repairs that our dealer always has available. We have no trouble getting good drivers, due to ease of operating the Gehl."

(*Signed*) Clarence Lacey

Free Packet . . . New booklet: "Streamlined Methods of Harvesting Hay and Making Grass Silage" . . . colorful Catalog of Gehl Forage Harvester . . . **free plans** for building self-unloading wagon box, using Gehl metal parts kit. **Write** *Gehl Bros. Mfg. Co., Dept.* MF-594, *West Bend, Wis.*

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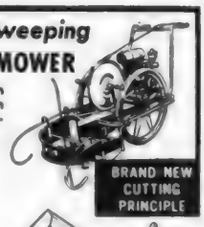
ROTARY MOWER

Highest efficiency in tough weeds . . . Superb work on lawns. Semi-solid tires—Inexpensive cutter sections—Non-wrapping cutter assembly—26" self-clearing swath.



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per minute and the pressure up to several hundred pounds.

Any pumping equipment you buy, regardless of type and size, should be backed by a reputable manufacturer and dealer, have repair parts easily available, be within the price range of other similar equipment, and work satisfactorily under your own water system conditions.

The most common ways of getting pressure at the faucet for farm buildings are with a gravity tank or a pressure tank. Gravity tanks are good where large water storage is needed or where the power source is a windmill or gasoline engine. With most of the new electric systems it is not used. These tanks are expensive to erect and may be unsightly, there is the possibility of water contamination, and water is warm in summer and subject to freezing in winter.

Pressure tanks vary in size from 12 to 3000 gallons. The 42-gallon size is the most common for home and farm use. Pressure is built by trapping the original air in the tank and compressing it by forcing water in with it. An automatic switch normally stops the pump at 40 pounds pressure—when the tank is about two-thirds full of water. When the faucet is opened, the compressed air forces the water out. The pump automatically starts again when the pressure drops to about 20 pounds.

Pressure tanks are small, inexpensive for the smaller sizes and easily installed in an inconspicuous place, but they may become "water-logged." As the water passes through the tank it gradually absorbs air until the supply is gone. With no air to provide pressure the tank can't deliver water. This is remedied by adding more air to replace that which has been absorbed. This may be done by draining the tank and refilling it as in the beginning, or by attaching a bicycle pump and forcing air in by hand. Most water systems today are equipped with automatic air controls of some form.

The majority of pumps and pressure tanks may be bought separately or mounted together as one unit for easy installation. Basement installation is fine for shallow-well or jet pumps if the basement is dry, well ventilated, and has a gravity drain.

The use of a pit-type installation is debated by some pump men because there is little drainage, the pits may be improperly constructed and ventilated, and it is difficult to keep out insects, dirt and rodents. Pits do, however, provide good protection against freezing and eliminate an extra building. The pump house costs little more than a well-built pit. It can be easily ventilated and drained, makes the pump available for oiling and repairs, and provides protection from surface water. If it is not properly insulated though, there is risk of the pump freezing.

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Plenty of water WHERE you need it, WHEN you need it!

Save water, save labor, save crops with Rain Bird Sprinklers, famous around the world for their faultless operation, even distribution of water. You'll find increased production at lower cost when you irrigate with Rain Bird.

There's a Rain Bird Sprinkler to fit every irrigation problem—19 models in all, ranging in size from 1½ G.P.M. at 3 pounds pressure to 610 G.P.M. at 120 pounds pressure.

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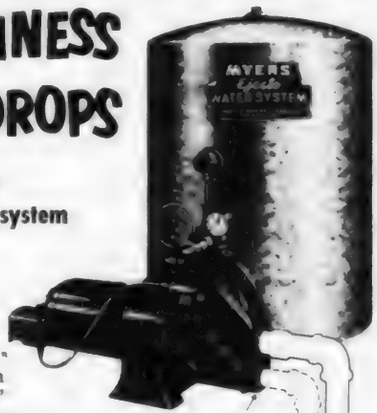
HOW TO STAY IN BUSINESS WHEN WATER LEVEL DROPS



Myers "HN" Ejecto Water System quickly and cheaply converted from shallow to deep well system

another reason why

More Buyers Buy Myers!

Nothing eats into profits faster than an uncertain or inadequate water supply. The Myers "HN" *Ejecto* water system is designed to free you from worry over falling water levels due to temporary drouth or long-time lowering of the water table. Besides being easily and inexpensively convertible, in place, from shallow to deep well operation, the Myers "HN" *Ejecto* can be handily moved from one source of water to another.

Be sure to ask your Myers dealer to study your needs. He can recommend the right model Myers water system to deliver ample water for all your farm and home needs—year in and year out even if water levels fluctuate as much as 100 ft.

Myers "HN" *Ejecto* Water System is really two water systems in one. By changing only the *Ejecto* attachments, the same pump, tank and motor deliver ample water under steady pressure from deep or shallow wells.

Shallow well attachment. For pumping water no higher than 20 feet.

Deep well attachment. A length of pipe fitted into the threaded hole at the pump provides the pressure tube needed to convert this system from shallow to deep lift operation.

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In long-range profit planning, owners everywhere are finding that there's no better investment than a dependable, durable Craine silo. The Craine line is time-proven, farm-proven—and the choice of successful dairymen everywhere. There's a Craine that's right for your needs.

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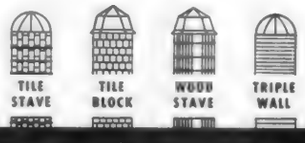
Craine, Inc., 652 Cedar St. Norwich, N. Y.



CRAINE SILOS

"Grow" soil while growing crops . . . or lose both, warns *Edward H. Faulkner* in SOIL DEVELOPMENT

The author of *Plowman's Folly* reports on his techniques for making good land out of bad land – and keeping the soil in production at the same time! He tells how, in two years, he changed hard-packed soil to a rich, fertile texture that can be scooped up like talcum powder; how he went about the job, the natural resources used, how you can do it, too. Order your copy of SOIL DEVELOPMENT today. Send this ad, with your name and address and $3.00, to University of Oklahoma Press, Dept. S-8, Norman, Oklahoma.

If one source is to supply all water used in and around the farm buildings, one pump and tank can serve the entire system. If, however, two or more sources must be relied on, pumps and tanks may have to be provided for each. For example, one cistern may supply the house with water and a second cistern may be used for the barn, milkhouse, and stock troughs. Separate pumps must be used. Or a well may provide water for the farm house, but water from the pond is piped to the barn, milkhouse, feed lot troughs.

In installing an automatic water system for the farm, there is no reason to be half-equipped. The major cost in installation is buying the pump and tank and developing the source. Water should be piped to the hogs and to the poultry house. For a comparatively small cost, a few extra feet of pipe can eliminate all water-carrying work for you. The new plastic pipes and fittings are easy to install for this kind of farm use.

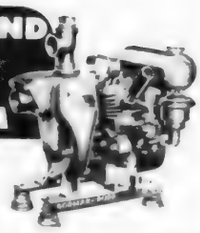
Galvanized iron and steel pipe and copper pipe and tubing are most commonly used in water systems today. The zinc coating on galvanized pipe helps prevent corrosion. Copper pipe comes in 20′ lengths and tubing can be bought in 30′-60′ coils. Although it is more expensive than galvanized iron, it will not corrode, connections can be made easily with solder or flange-type joints, and tubing can be bent to miss obstructions and eliminate fittings. It will stand four to ten freezings without bursting. The life of galvanized iron pipe underground is generally considered to be 15-30 years, while the life of heavy-gage copper tubing for underground use is estimated by some plumbers to be 100 years.

Exposed pipes should be insulated against both heat and cold. An asbestos corrugated covering may be wrapped on hot water pipes inside buildings. Underground cold water pipes are usually protected against freezing if laid below the freezing level—2½ to 3 feet deep. A stop and waste cock should be placed in the main supply pipe to the house so that fixtures and inside pipes may be drained at times when they are likely to freeze or when repairs are needed. Frostproof hydrants, which cost little more than ordinary faucets, are a worthwhile investment.

Many states have plumbing codes which regulate installation of plumbing, private water supply and sewage disposal systems. In many instances plans must be approved before work begins and state inspectors must approve the plumbing before it is covered. When buying material, or when contracting for a plumbing job, it is wise to insist on materials and installation that comply with any existing state code. The state or county board of health can give the procedure to follow, and give you an inspection certificate.

If fire breaks out on your farm it is

AN ALL'ROUND PUMP for the FARM



The MIDGET 1½" *Lightweight*

For farm uses too numerous to list! Pumps 400 times its weight of water per hour at average heads. Primes in 75 sec. at 25 ft. suct. lift. Has maximum lift of 30 ft. (Sea level). Weighs only 62 lbs.

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The Midget 1½"	— wgt. 62 lbs.	—	5,500 G.P.H.
The Pelican 2"	— wgt. 70 lbs.	—	7,500 G.P.H.
The Hawk 2"	— wgt. 110 lbs.	—	10,000 G.P.H.
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much more likely to be controlled when water is automatically available. For that reason it is a good idea to consider fire-fighting needs when planning your system. Even though there may be an organized volunteer fire-fighting group in your community they will very likely need the help of extra water since their water truck would rarely carry more than 400-500 gallons. If possible, any pond constructed should be within 400-500 yards of farm buildings, or if cisterns are built near the barn, there should be an opening in them large enough for a fire hose to enter so that the source may be tapped in an emergency.

To fight fire effectively either a solid stream of water at medium pressure (250 gallons or more per minute at 40-50 pounds) or a fog at high pressure (15-30 gallons per minute at 500-600 pounds) is needed. Supplying one ¾-inch nozzle at 45 pounds pressure per square inch for two hours will take enough water to fill a tank ten feet deep. An effective fire-fighting fog can be created by a modern orchard spraying outfit designed for 600 pounds pressure per square inch and equipped with a hose and nozzle. Portable spraying outfits are seldom equipped with tanks of more than 400 gallons capacity: therefore, provision should be made for refilling the tank quickly.

Cost of the System

The cost of pumps and pressure tanks vary with manufacturer, type, capacity and horsepower of pump, and the size of tank. One piston-type pump for shallow wells with a ½-horsepower motor, a 42-gallon tank and a capacity of 275-375 gallons per hour, costs approximately $145.

A second shallow-well piston-type pump with a 350 G.P.H. capacity costs around $110 with a 12-gallon tank and goes up a $121 with a 30-gallon tank. Another manufacturer produces a similar type pump with ¼-horsepower motor and an 18-gallon tank for $135.

A second shallow-well piston-type pump with a 350 G.P.H. capacity ranges from $239 to $365, depending on size of motor and capacity. A second manufacturer's deep-well pump, with ⅓-horsepower motor and a 42-gallon tank, is listed at $230.

One jet-type pump for shallow wells has a capacity of 240-825 G.P.H. and a choice of ¼, ⅓, or ½ horsepower motors. Price ranges from $150 to $175. Another jet pump for deep wells with a range of 200-4500 G.P.H. capacity and motors from ⅓-5 horsepower, starts at $178.

Electricity used to operate your system does a lot for little cost. For example, one kilowatt hour of electric power costing 3 cents per hour (which is a good farm average) pumps and carries 1000 gallons of water with a shallow well pump. A deep-well pump requires about 2 kilowatt hours to pump this amount. If an average family of four requires 70,000 gallons of water per year, the cost would be only $2.10 for electricity. Each milk cow consumes about 10,000 gallons of water a year—thirty cents worth of electricity.

Abundant water is much more than a matter of convenience, health and comfort today. It is hard-headed dollars-and-cents good business. Agricultural experts say milk production increases 10-20 per cent when the dairy herd has plenty of clean, fresh drinking water. Poultrymen will tell you that clean water at the right temperature is the cheapest egg-producer for laying hens. When there is enough drinking water for the stock, cattle, hogs, and sheep will fatten more quickly with less feed. Hogs, for instance, have made 15-17 per cent cheaper gains when given all the warmed water they could drink.

Since half the cost of a farm water system is piping the water to the barn, the dairy and hog and chicken houses, this proportion of the total cost can be depreciated for tax purposes as a farm capital investment. It can be depreciated on a 25 year basis.

There is no need for today's farm wife to be like the woman who for 50 years made an average of four trips a day from the house to the well, 20 feet from the house and 10 feet lower. During these 50 years she carried 7,000 barrels of water, walked a distance equivalent to that from New York to San Francisco and back, and climbed a distance equal to 100 trips up and down Pikes Peak.

Supply all minerals livestock need this LOW-COST WAY

MINERALS account for less than five per cent of the body weight of the animal. Their importance, however, is out of all proportion to their actual percentage.

Minerals make up a large part of the bone structure of the animal. They are needed by the vital organs — the heart, liver, kidneys. They are needed for the production of milk, for reproduction, for the digestion and assimilation of feed . . . for all those basic activities that convert feed into nutrients and that, in turn, build nutrients into blood, bone, muscle tissue, milk, wool, and healthy, vigorous young.

That is why it is so important to be sure your animals are getting a safe, dependable supply of all the vital minerals they need.

The most economical way to supply a balanced mineral ration is to put a mixture of bone meal and ground limestone or their equivalent in one side of a divided mineral box. This supplies calcium and phosphorus in quantity, as well as traces of sulphur, magnesium and potassium.

In the other side of the box put Morton Trace Mineralized Salt. This supplies the sodium and chlorine of salt, as well as adequate amounts of iron, copper, cobalt, manganese, iodine and zinc.

Kept before your livestock all the time, this combination is complete. It has the approval of leading animal nutritionists. It is low in cost.

Your dealer has Morton Free Choice Trace Mineralized Salt in stock. Costing only a few cents more per animal per year than salt alone, it is like a low-cost insurance policy that protects the health and thrift of livestock and your profits. Ask for Morton Trace Mineralized Salt by name. Feed it free choice.

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By far the easiest and quickest to install—so simple it's no trouble at all—so economical it quickly pays for itself—so satisfactory for lifetime. L-P Gas modernizes farm and home with power, and heat for cooking, refrigeration, freezing, heating, etc.

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NUTRITIONAL RESEARCH ASSOCIATES
SOUTH WHITLEY, INDIANA
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L. P. GAS FOR FARM TRACTORS

(Continued from page 69)

the East, the margin of savings gets thinner and may even vanish.

While conversion may put money in one pocket on fuel savings, two gimmicks take it out of the other pocket. These are the cost of conversion or the increased price of manufactured L. P. gas tractors, and the cost of a storage tank. A new L. P. tractor costs from $200 to $300 more than the same model of gasoline tractor. Field conversion kits, which include a bulbous, high pressure fuel tank and a carburetor, can be bought for as low as $125.00. These low priced kits change only the fuel systems and only in rare cases do they effect real savings. The more expensive kits, which modify not only the fuel system, but the compression ratio, valves, and often the spark plugs and manifolds, may run as high as $600.00. Few farmers are using them because this high cost is about twice that of the difference in the new cost of a gasoline tractor and the same model of L. P. equipped machine.

An L. P. gas user should have a large storage tank with a refueling coupling, safety valve and gauge. A 500 gallon tank, complete, costs $300.00 up; a 1,000 gallon unit, $500.00 up. Some dealers will rent tanks, others supply tanks but absorb the cost in a higher price per gallon for the gas. But the farmer pays in the end. Therefore, with an average expenditure of $1,000.00 for an efficient changeover, the farmer can figure how much gasoline he uses a year, the expected life of his tractor and his tank, and find out for himself how profitable a conversion will be. If the gas is used for household purposes, cooking and/or heating, the cost of the storage tank is spread to the home.

In addition to the potentially cheaper cost, L. P. gas has other advantages. A tractor gets more power with L. P. gas; some engineers say about 9%. In ordinary temperatures L. P. gas is more sympathetic to easy starting, but may be cranky in cold weather, or if adjustments are out of kilter. There is less need of oil change since there is no free gasoline to dilute crank case oil. There is less engine wear and less fouling of valves because less carbon forms in the combustion chamber, since there is uniform and complete combustion. The octane rating of L. P. is about 125; that of gasoline is 70 to 90.

What's Wrong with It?

Like a wall, L. P. gas has two sides. On the shady side of the wall are several dead cats. Among them is the high initial cost of conversion and fuel storage. Also, refueling in the field is not as easy as tipping up a gasoline can and draining it into the tank. A farmer must take an auxiliary tank to the field and must carefully connect the couplings, so that refueling takes longer. Conversion units with

Orlyt GREENHOUSE
THIS MODEL $395

A practical addition to your farm or home. Costs less than buildings of usual constructions. Made in sections for easy assembly with bolts and screws. Size 10 by 11 ready to go on your foundation. 5 models. Choice of slanted or straight sides and Lean-to greenhouses from $175. State if wanted for home or farm. Automatic heat and ventilation available. Write for Free Booklet No. 23SM.

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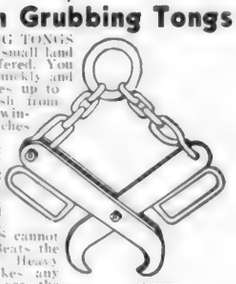

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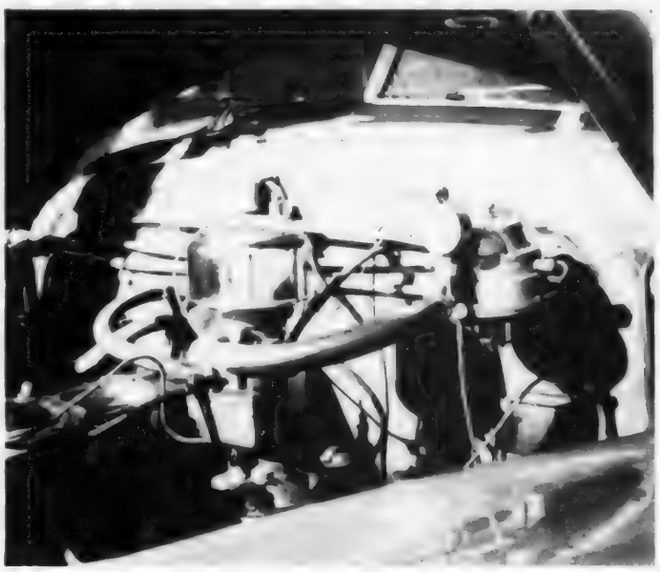
incorrect carburetor adjustments are likely to cause valve trouble, because the high combustion temperatures may burn out ordinary valves. This is an argument for those kits with special alloy valves.

Anti-freeze solutions to protect against sub-zero temperatures must be used in the tractor cooling system at all times, both summer and winter. Otherwise the vaporizer is likely to freeze.

L. P. gas does not operate efficiently with low compression ratios. The ordinary tractor has a compression ratio of 6:1 or 7:1, while L. P. fuels require a ratio as high as 10:1. Connecting rods and rod and crankshaft bearings are unduly strained by L. P. gas when changed in conversion. It is doubtful if any conversion kit is a good investment for a tractor unless the compression ratio is changed. Some trucks and automobiles, having higher compression ratios, may use the cheaper kits more efficiently.

Because a combustible gas under high pressure always is a hazard, L. P. gas is more dangerous to handle than gasoline. In refueling, as the gas is released from high pressure, it cools couplings to very low temperatures and careless handling may result in a frost bite. A leak can freeze a finger tip before you can say skat. The vapor is heavier than air and will settle in pockets when there are no air currents to scatter it. Smoking is dangerous when handling the gas and flames or a stray spark in



A CHEVROLET engine converted to L. P. gas.

or around a building which houses L.P. equipment is an invitation to suicide. Tanks and fuel lines must be perfectly sealed.

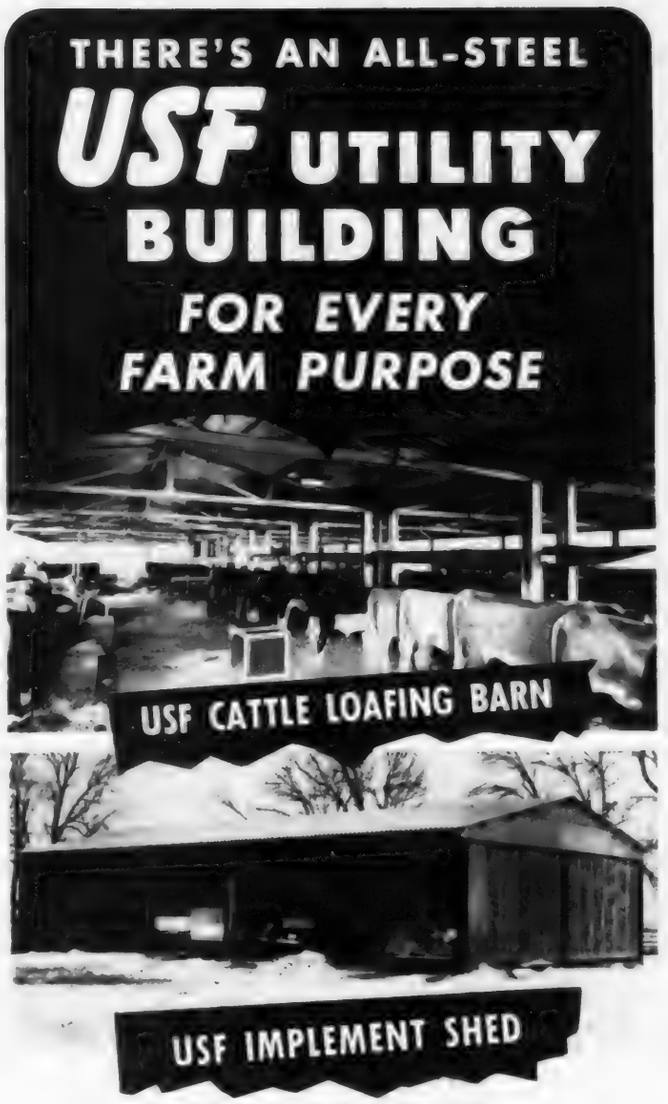
Some People Like It Fine

One of the unhappiest experiences a farmer can have is to be the victim of a cheap conversion kit and a cranky old tractor. Chris Baker of Boone County, Kentucky, says, "I burned up a set of valves in one day's plowing. I guess it wasn't the tractor's fault—I just didn't want to put out the money for the special valves."

Sid Oaks, of Brookville, Indiana, says, "When my old tractor was going good on L. P. she purred like a cat full of milk. But that wasn't very often. There's so many adjustments that can get out of kilter, one of them was always wrong. I got half way through my spring plowing and put my old gasoline rig back on."

Pete Varillo, a grape grower of Vista, California, tried an L. P. conversion kit. He says, "Maybe it was because my tractor was old to begin with, but it sure went to pieces in a hurry when I changed it to gas. Burned out one bearing after another. Turned it in for a new gasoline job."

Pete says he didn't get an L.P. tractor for two reasons, first, because he would have to wait a long time for delivery, and second, because his first experience with the gas was not pleasant. He admits the fuel saving is considerable.



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VERSATILE—*Six* types of interchangeable wall panels adapt design to any farm purpose.

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UNITED STEEL FABRICATORS, INC.

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PRODUCTS: Hollow Metal Doors • Prefabricated Metal Buildings • Windows • Highway Guard Rail • Bridge Flooring • Corrugated Metal Pipe

Here's an electric pump that makes fueling safer. Operates from an underground tank. Reduces hazards of fuel handling. Delivers gasoline directly to trucks, tractors or other equipment. Pumps 10 gallons a minute. Weather-resisting, baked enamel finish. It's ideal for the modern farm. See your Tokheim dealer or your oil company.

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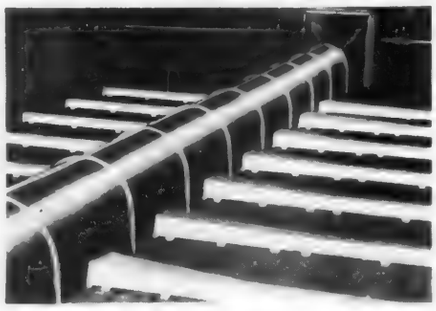

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Don't lose your hay! With a Louden Hi-Dri, your hay can go in the mow the day it's cut. Only Hi-Dri has all these advantages:

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CROP-SAVER — Built to last a lifetime. Lower operating cost. **The same fan-unit will dry your corn and other crops.**

Saving just one crop pays for your Hi-Dri. Send for FREE cost-estimate, giving size of your mow.

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LOUDEN

the GRADE-A line of Barn Equipment

On the other hand, farmers who have used the factory made L. P. tractors are the biggest boosters for the new fuel. "I disced up soybean stubble for wheat seeding last fall at a fuel cost of a dime an acre," Clyde Johnson of West Jefferson, Ohio, reports. "With my L. P. equipped tractor, I can walk away from fellows who use gasoline. I can run one gear higher and do the same amount of work."

Johnson, who owns a 330 acre farm in central Ohio, was one of the first farmers in his area to use L. P. gas as tractor fuel. He heats his home with the gas and his wife uses it in the kitchen. Their 1,000 gallon storage tank serves both the home and the tractor.

Johnson used 3,200 gallons of L. P. last year in his home and as tractor fuel. He put out 130 acres of corn, 60 acres of soybean and had a sizeable hay acreage.

Where to Buy L. P. Kits and Tractors

Among the manufacturers who make conversion kits are the Algas Corp., Los Angeles; The Century Gas Equipment Co., Linwood, Cal.; The Climax Controls Division of Black, Sivalls & Bryson, Inc., Tulsa, Okla.; The Dix Manufacturing Co., Los Angeles; The Ensign Carburetor Co., Huntington Park, Cal.; The J. & S. Carburetor Co., Dallas, Texas; The Roadmaster, made by the Borg-Warner Corp., Chicago; The A. O. Smith Co., Milwaukee, Wis.; American Liquid Gas Corp., Los Angeles; Baker Flash O Tractor Co., Plainview, Tex.; Buller Manufacturing Co., Hillsboro, Kan.; Darlingas Co., Pratt, Kans.; The United Petroleum Gas Co., Minneapolis, Minn. Many of these conversion kits are used on automobiles and trucks as well as tractors.

Not all tractor companies are making a factory made L. P. gas tractor, and none yet are making them in large numbers. Case, Oliver, International Harvester, Minneapolis-Moline, and Massey-Harris now make factory installed units. John Deere, Ford, Ferguson, Allis Chalmers, and Gibson have not as yet announced an L. P. tractor. However, suitable kits for L. P. gas are sold.

Manufacturers believe L. P. gas as a tractor fuel is here to stay and are planning on making regular L. P. gas models as fast as factory conditions will permit. You can buy an L. P. gas tractor practically anywhere in the United States if you are willing to wait your turn at the dealers.

L. P. gas has the edge over gasoline in some areas because of its cost. The farmer will have to do his own figuring, depending on where he lives and what he must pay for the fuel in competition with gasoline. He will have to weigh the advantages and disadvantages and make his own decision according to the conditions on his own farm, just what his wife does when she buys a new hat.

Keep up on new crops and planting tips with FREE 2-year subscription to CROP NEWS & VIEWS. Just write to *Scott* FARM SEED CO. Locust St., Mechanicsburg, O

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CATTLE SHEEP AND HOGS

Used by U. S. Dept. of Agriculture, State Depts. and prominent breeders. Pliable, rust-resistant steel.

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ORDER NOW!—PRICES INCLUDE NUMBERING!

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Quantity	Price
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500	7.30
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EAR TAGS		
Quantity	Hog, Sheep	Cattle
50	$1.65	$1.80
100	2.75	3.10
300	5.95	7.50

Applicator $1.85

Stamping name and address on any quantity ear tags, $1.65
BULL RINGS, CATTLE LEADS, ETC.—SEND FOR PRICES

National Band & Tag Co., Dept. 6-484, Newport, Ky.

8-year experiment shows Angus calves average

66 LBS. MORE AT WEANING

In 8 continuous years of comparison by a leading state university between two major beef breeds involving 374 calves . . . ANGUS purebred calves outweighed purebred calves of the other breed by 66 lbs. average at weaning time. Since all calves were fed and handled the same, this accurate experiment proves: "Angus calves grow faster!" Be ahead! Buy Blacks! Wean bigger calves!

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PIXTONE

Means BIG SAVINGS, BETTER PROFITS for YOU.

In these labor-short days the only way to make a profit on your farming operations is to reduce losses, to increase efficiency. PIX-TONE is the revolutionary new mechanical stone-picker that picks up stones from 1½" to 8" in diameter from your fields, carries and dumps them. Results: easier working of fields, greatly reduced implement breakage, increased productivity. Write us for new illustrated circular giving complete information, name of nearest dealer.

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We have a DIAMOND Water Softener

SEND FOR THIS BOOKLET

A DIAMOND Water Softener removes the minerals that cause hard water. Soft water does the work in laundering and dishwashing.

Oshkosh Filter & Softener Co.

CAN WE MAKE IT RAIN?

(Continued from page 37)

of the United States during winter. I would anticipate it would decrease the cloudiness, prevent ice storms, storms of freezing rain, and icing conditions in clouds. It should be possible to change the average temperature of some regions during winter months. Rain may be produced or prevented, hurricanes and large snowstorms may be diverted to unpopulated areas, hailstorms and resultant lightning causing crop damage may be eliminated."

One waggish scientist has visualized the time—50 years hence—when we will vote on the type of weather we want. "The complications could be terrific," he says, "for how could a politician please both the farmers and city dwellers. City people won't want rain on any day during the whole summer: it would always spoil someone's picnic."

There are several advantages of the silver iodide smoke method of seeding rain clouds which make it practical for the rainmakers: It is more economical—30 milligrams of silver iodide (a quantity about the size of half a drop of water) fed into the air from the ground, will seed a cubic mile of the earth's atmosphere and could produce or increase the rainfall over a large area. It is more practical—for silver iodide crystals will start their action at 25° F. above zero and work well at temperatures down as low as 35° below zero. Dry ice, which must be dropped from airplanes, produces rain or snow in the range from freezing down as low as 38° below zero F. Nature's own nuclei, dust and smoke, work best in the temperature range from 15 to 38° below zero F.

Taking their experimental findings to the dry areas of the West was the next step for Dr. Langmuir and his associates. The GE scientists did this as consultants for the U. S. Army Signal Corps and the Office of Naval Research for "Project Cirrus," an appropriate name since cirrus clouds are made up of high-flying ice crystals which swish across the sky four to eight miles above the earth. The scientists were welcomed with open arms by New Mexico ranchers who were accustomed to seeing their water holes dry up in the summer until they were too sticky for cattle to drink from, yet too soft to plow.

Early on a morning in July 1949, when the Weather Bureau was forecasting "no rain today," the Project Cirrus scientists set their silver iodide generators going near Albuquerque. Then they watched the towering cumulus clouds which usually fly right across New Mexico. Downwind from the generators one cloud had grown to 26,000 feet high by 8:30 in the morning. As it spurted higher into the cold air, the Project's radar operators

Mr. Dairyman!

HOT WATER WHEN AND WHERE YOU WANT IT!

THE STRAUSS 15 GAL. WATER HEATER

Designed especially for you — the ingenious STRAUSS Electric Dairy Water Heater works automatically either on your regular water pressure line or by "pouring in" . . . Plug in anywhere . . . Pour in a pail of cold water — draw off a pail of hot! No waiting.

Heats water *fast* — and heavy insulation 3 inches thick *keeps* it hot!

15 gallon capacity. Economical to operate — uses only 2 kilowatts an hour when heating. Thermostatic control keeps power use at minimum. Low cost; fully guaranteed. Ten year warranty on tank.

Call on your UNIVERSAL dealer for complete information or write to the factory.

UNIVERSAL also offers you complete selection of STRAUSS Electric Water Heaters for abundant hot water in your home. 30, 50, 66 and 80 gallon capacities. A STRAUSS Gas Water Heater, too, in 30 gallon capacity.

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This 28-page booklet tells the story of what farmers have been able to do in increasing the gross income by modest investments in registered Guernsey cattle. It also tells the story of the inherited characteristics of this breed, so noted for high production of the top selling premium milk in America. Many of the great brood cows of the breed are illustrated.

This is an informative booklet designed to give the reader valuable and interesting information which can mean increased returns for his farm enterprise.

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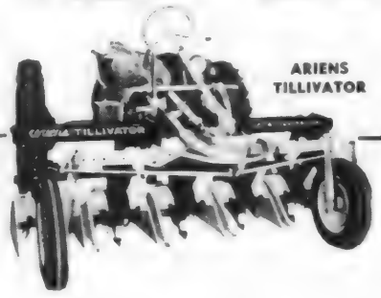

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probed its depth and content. Rapid calculations from the radar echo showed it contained considerable rain or snow. A second cloud followed suit. And that morning heavy rains fell in the nearby Manzano Mountains.

The Skeptics Aren't Convinced

The rainstorm that was brewed in the mountains by this experiment has since been matched in intensity by the arguments as to whether rainmaking was possible or practical. This rainfall in the Manzano Mountains would have happened anyhow, said some meteorologists, for a sudden wind shift had brought a front in from the Gulf of Mexico. Other weather men say that all weather is influenced by the "synoptic situation," that is, the varying pressures, temperature and winds in air masses.

At the meeting of the American Meteorological Society in New York in January, 1952, E. J. Workman, President of the New Mexico Institute of Mining and Technology, reported: "Our simple field experiments designed to test elements of current rainmaking or rain-increasing practice have been inconclusive for the most part, and moreover, our accumulated laboratory observations give us cause to doubt some of the basic assumptions inherent in the youthful rainmaking technology."

But in the water-starved West, the Weather Consultants have gone about their business of making rain on contract during the past three summers. In Oregon, North American Weather Consultants of Pasadena, California, ran a cloud-seeding operation from August to October, 1951, using portable silver iodide generators. Their target area was Tillamook County, where they hoped to prevent forest fires. Their results were spectacular compared with a "normal" rainfall of 7 inches for the period. They reported a total of 13.78 inches, or almost double normal.

Said Eugene Bollay, the President of this firm, "In 1951 our work expanded in that the entire Santa Barbara County contracted for our service. The work in the High Sierras is continuing and we conducted cloud seeding programs for the City of San Diego over their water shed in the mountains behind San Diego. In addition, we expanded our operations into Washington, Idaho and Oregon where we accepted some contracts from public utilities for producing increased precipitation for use in hydro-electric projects. In all of our programs we have been able to observe a definite increase in the precipitation."

Rainmaking Co-op

Near Los Angeles, in the Santa Ana River Watershed, is an area of 3,000 square miles with a population of 155,000. The citizens decided to do something about the dry weather so they formed a cooperative rainmaking outfit. It is called the Santa Ana River Weather

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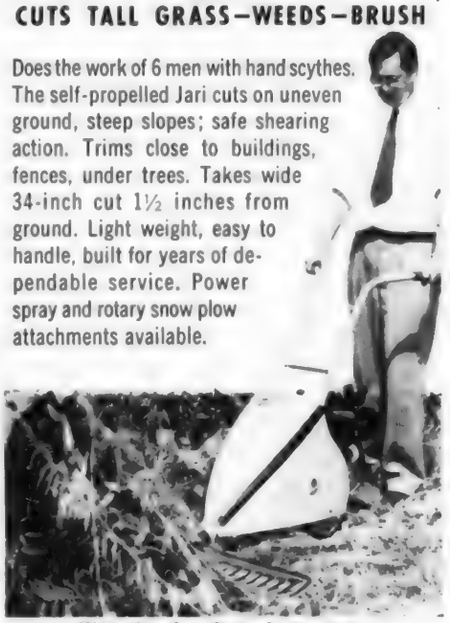

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Corporation and the Meteorologist-Manager is John A. Battle. Summing up their rainmaking during the winter of 1950-51, he said, "The Santa Ana River Watershed received about 7% more precipitation than the unseeded nearby areas. Approximately 78,425 acre-feet of water fell. At $10 per acre foot (the going price of water in this area), this would be worth $784,250."

An eastern weather consultant firm, the W. E. Howell Associates, Inc., of Cambridge, Massachusetts, is conducting many rainfall stimulation programs, particularly for industrial interests. This firm has a staff of professional meteorologists headed by Dr. Howell of Harvard University, who is the leading weather consultant of the east. Projects conducted by them have centered on hydroelectric, mining, and pulp and paper industries in the United States, Canada, and South America. They also have had particular success with the industrialized agriculture of the sugar industry in Cuba and Peru.

Their results in Cuba are interesting because scientific evaluation of operations can be made with a greater degree of accuracy than in any other area encountered. This is due to the general uniformity of rain producing elements and the density of daily reporting rain gauge stations (averaging one per 10 square miles) plus the many years of records of this network of rain gauges. These evaluations are indicating an average of 29% increase of precipitation on target plantation areas as compared with non-seeded adjacent plantation areas.

Dr. Howell was the meteorologist retained by the City of New York to produce rain in 1950 at $100 a day. New York was in the midst of a water famine; the reservoirs in the Catskill Mountains were nearly dry. New Yorkers felt it was their civic duty not to bathe or shave oftener than every other day. Restaurants served no water with meals. After Dr. Howell got busy early in 1950, New York had a miserable, wet spring. Sweet corn, a big money crop in nearby farm areas was badly damaged. Catskill Mountain resort owners complained that their business was bad. But the reservoirs filled up.

Dr. Krick's Expanding Program

Dr. Irving P. Krick was excited by the possibilities of making rain with silver iodide generators for the dry areas of the West. In 1948 he resigned as Head of the Meteorology Department of the California Institute of Technology and took with him key personnel to form a non-profit research organization, the American Institute of Aerological Research, designed to explore further the business of increasing rain.

By June of 1950 Dr. Krick had built what he felt was a satisfactory silver iodide generator and a new firm, the Water Resources Development Corporation, was formed and undertook its first commercial

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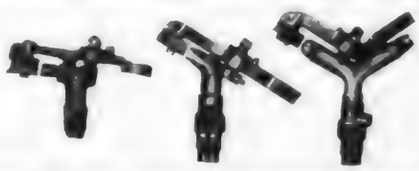

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application of cloud seeding on a large scale. This was in the Horse Heaven country of eastern Washington, with headquarters at Prosser, Wash. This first operation had as its target 100,000 acres of wheat land.

By June, 1951 this acreage had grown to 325 million acres and this spring there are indications that the acreage figure will surpass the 1951 total. The work is currently being conducted in 17 western states and Mexico and is supervised by a staff of over one hundred people.

Ranchers Don't Read Weather Maps

Said a member of Dr. Krick's staff: "Many ranchers and farmers who have contributed to rain-increasing projects still fail to realize that maximum benefits are obtained when the process is applied to a major frontal weather system. Most of these people consider their weather a strictly local proposition and they are not familiar with weather maps which show that weather actually is a hemisphere-wide proposition.

"Natural variations in the weather over all target areas exerts a terrific influence on actual precipitation amounts. An area which has been blessed with ideal cloud seeding opportunities throughout one entire summer may be cursed with a shortage of ideal seeding opportunities during the following summer. Farmers and ranchers in this area are inclined to feel that it is the fault of the operators if results are not as good the second year."

Dr. Krick has blanketed several areas of the west with silver iodide generators in such a way that it is possible to see cloud frontal systems for the benefit of each of his target areas as the right kind of clouds pass over each area, regardless of the direction of flow or the speed of flow.

All operations are controlled from Denver and when the meteorologists, (Dr. Krick has 31 on his staff) in the Denver office receive information over the weather teletypes that a good seeding opportunity is developing, they determine which generators should be operated and when, and then call the individual operators by phone ordering them to turn the generators on. Field supervisors in a fleet of 19 panel trucks run spot checks on the silver iodide generator operators to make sure they are complying with directions, keeping their generators in good shape, and have adequate fuel supplies.

Suppose It Rains Too Much?

Abundant rainfall can be a mixed blessing. Scientists soon saw that as rainmaking became a better understood science there were bound to be problems. Suppose a flood wiped out a valley town and there had been rainmaking activity in the area—who was liable? Was it an Act of God or could the weather consultants be sued? In 1951, Senate and House Com-

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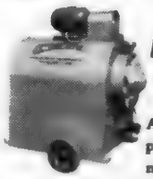

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mittees conducted hearings in Washington on weather legislation on Bills S.5, S.222 and S.798. Additional hearings are scheduled for this year. Already most Western states either have passed or are considering laws to govern rainmaking.

How did farmers react in areas in which rainmaking was in progess? Some were for it. Some felt that men were tinkering with nature. Some said the Almighty would step in and do something drastic and punish those who were horning in on His exclusive right to make weather.

In the Yakima Valley of Washington, Ben Klindsworth, a wheat grower and member of the Big Bend Water Development Company, was served with a summons by Attorney Homer Splawn, representing Kiutus Tecumseh, who claimed his hay was damaged to the tune of $800. Tecumseh was quoted as saying, "Rainmaking should be stopped until we find out who owns the clouds and weather conditions affecting the Yakima Valley. It should be stopped until these 'medicine men' can control the effects of their manipulations of nature."

Long Distance Rainmaking

Dr. Langmuir in summing up his findings on Project Cirrus in January, 1952, before the American Meteorological Society, spoke of the periodic seedings of silver iodide in New Mexico which were made on Tuesdays, Wednesdays and Thursdays each week during several months in 1951. This periodic seeding was undertaken so the results could be tabulated against the normal. Backing up his belief that he can affect many weather conditions easier 1500 miles away from the seeding stations than he can at 30 miles, Dr. Langmuir said: "It was found that heavy rains (after periodic seeding) occurred within an area of about 350,000 square miles, bounded approximately by Springfield, Missouri, Pittsburgh, Pennsylvania, Chattanooga, Tennessee and Milwaukee, Wisconsin."

The U.S. Weather Bureau through its Chief, Dr. Francis W. Reichelderfer, takes a conservative view of the possibility of making rain. The cloud seeding which the Weather Bureau did at the Army Air Force All Weather Project near Wilmington, Ohio, during the summer of 1948 gave results that were inconclusive. Says Dr. Reichelderfer, "Using dry ice under *certain special conditions*, it is probable that precipitation can be increased 5 to 10% in some parts of the country during the most favorable season. If it is used on a day to day basis on whatever clouds happen to be present, the probable increase is very much smaller. It is as yet too early to say whether substantial increases are possible using silver iodide."

This summer a farmer will have to let his pocketbook and the acuteness of his need for rain be his guide. He can join together with a group of farmers and hire a weather consultant which will bring his costs for hoped-for rain as low as ½ cent an acre. Or he can let nature take its course and hope the rain clouds blow his way.

So there seems to be fairly complete agreement among all the people in the weather field that given the right conditions rainfall can be increased, but there is no one who is willing to stick his neck out to the extent of making a rain exactly

A TYPICAL summer thunderstorm of the type that responds to cloud seeding.

when and where it is needed. But its a young science, less than eight years old. Give the rain-makers time; in another twenty-five years we may have weather available on order, F.O.B. your state or county.

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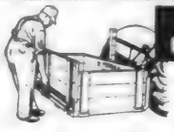

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FARM BOOKS

***Soil Development,** by Edward H. Faulkner, University of Oklahoma Press, $3.00.* *Soil Development* is going to cause about as much high blood pressure among orthodox agronomists as did Faulkner's earlier book, *Plowman's Folly.*

Since writing his earlier book in which he condemned the plow to everlasting perdition, Faulkner has purchased a worn-out farm near Elyria, Ohio. He felt that it wouldn't be correct for the author of *Plowman's Folly* to do anything but practice what he preached, so he has farmed his land without the use of a plow—using only a disc to turn over the top soil—and without the use of lime, chemical fertilizer, or animal manure.

Faulkner's present book describes his findings. He claims that after seven years, he has proved that soil can be *grown* at the same time it is made to produce crops. "I believe," he says, "the work now being done will gradually bring this land again to a condition resembling its original status as of about 1815 when settlement began in this region. The conditions for . . . the health of the soil have been re-established." He also says, "What has happened on my farm can be brought about by others elsewhere. I have no 'drag' with Nature."

What Faulkner claims to have done with his soil is to change it from land that was so tight it was hardly scarred by a disc the first year, into land that can be worked with a man's bare hands. Probably his most controversial theory in the present book is that no chemical nor animal fertilizer need be put on the soil to bring it into productivity. There is, he feels, an abundance of the needed mineral elements in the soil and the sub-soil waiting to be drawn to the surface by the plants. If the plant matter is then turned under to become humus, we are replenishing the top soil with the chemicals needed for plant growth. This, of course, provided we don't turn under the plant material too deeply with a plow.

Almost as though to make sure he has no allies at all, Faulkner states that he disagrees with most of the organic people in that he feels composting is a waste of time.

***Bobby Bluegill,** by R. W. Eschmeyer, Fisherman Press, Oxford, Ohio, $1.50.* *Bobby Bluegill* is a delightfully written children's book about a fish. Bobby, his 590,000 brother and sister bluegills, about their enemies the bass and the blue heron, and about the pond in which they all lived. It is also the story of how Jerry Johnson and his father manage the pond in which Bobby and his many, many relatives live. This part of the story tells of the conservation measures which the Johnsons practice and how they brought the fish population into balance after it had become overpopulated with bluegills. Though written for children, we suspect that parents, particularly those interested in fishing or in pond management, will read the book with pleasure and profit, too. *Bobby Bluegill* is one of a series of nature books for small fry which include *Billy Bass, Tommy Trout, Freddy Fox Squirrel,* and others.

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***Pork Production,** by William W. Smith, The Macmillan Co., New York, $5.50.* Rapid change in our methods of feeding and managing swine created the need for a new edition of this book. The feeding of B_{12} and antibiotics, the increase in our knowledge of the values of pasture feeding, new management practices such as production registry work and the use of farrowing crates are all fully covered in the new edition.

Dr. Smith has made *Pork Production* more readable by simplifying the sentence structure and condensing the writing, and it has been made more legible by the use of a bolder type. The size of the book has been increased to 616 pages.

***Veterinary Guide for Farmers,** by G. W. Stamm, Windsor Press, $3.50.*

A new edition of this well received farmers' veterinary book is now off the press. One hundred new pages have been added to the book, along with a considerable amount of new material.

One of the new features included in the second edition is a 12-page diagnosis chart of common animal diseases. This chart gives the disease, the kinds of animals affected, the age at which animals are most susceptible, principal symptoms of the disease, geographical distribution, the seasons of the greatest occurance, and other valuable information in determining the nature of any of the common animal diseases.

BUILDING A HIGH PRODUCING DAIRY HERD

(Continued from page 47)

have fed each cow 40 to 50 pounds of hay silage a day and 20 to 25 pounds of hay.

"Our feed mixture which runs about 12% digestible protein is as follows:

900 pounds of ground oats
900 pounds of corn cob meal
200 pounds of 32% molasses concentrate
25 pounds of Peets Mineral Mix

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We stick pretty close to the rule of one pound of this grain mixture for every four pounds of milk the cow produces. We feed this at milking time. The cattle have free choice of salt."

In March of 1952 the Brooks had five cows dry out of 27 milkers and they plan to allow a two months rest period in which a cow is dry, between freshenings.

The Brooks started testing in 1946 and their average milk production at that time, was 9,536 pounds of milk and 315 pounds of butterfat. In 1951, on official test, their average was 14,196 pounds of milk and 504 pounds of butterfat. With this kind of production they have no trouble selling all their young bulls for breeding purposes.

The Brooks have a two-word answer when you ask them how they brought their average up; it is, "good bulls."

Says H. J. Brooks, "There is a certain amount of luck that goes with all cattle breeding and I suppose we have had our share. We've had three bulls that came from Sam Johnson's Windy Shade Farm at West Chester, Ohio. Johnson had a bull that did in two generations, for him, what top breeders have tried to do over many years. The bull's name was Winterthur-Posch Ormsby Fobes, Holstein No. 835919. In his herd, which has been in existence 10 years, he has had more 'Excellent' daughters than any other herd in Ohio. The bulls we've bought from Johnson deserve a good share of the credit for bringing up our herd production."

The Brooks always have two or three bulls that they keep on the place, but they use artificial insemination when they can

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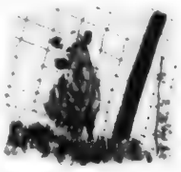

The Editors of the Farm Quarterly, after a careful selection of current agricultural books, recommend the following to our readers.

Livestock

Pork Production—*by W. W. Smith* $5.50
A revised edition of this excellent book for the hog farmer.

Swine Production—*by W. E. Carroll & J. L. Krider* $5.75
An important new book on producing hogs and managing them.

Livestock Health Encyclopedia—*by Rudolph Seiden* $7.50
An alphabetical reference book on animal diseases and sanitation.

Restraint of Animals—*by J. R. Leahy & P. Barrow* $3.50
Line drawings and text tell how to hold animals for treatment.

Feeds and Feeding (21st ed.)—*by F. B. Morrison* $7.00
The authoritative book on livestock and poultry feeding.

Dairy Science (2nd ed.)—*by W. E. Petersen* $6.00
A new edition of one of the best and most complete books on dairying.

Sheep Management and Diseases—*by H. G. Belschner* $10.00
Written by an Australian authority, this book is for all sheep men.

Beef Cattle—*by Roscoe R. Snapp* $6.50
A carefully revised edition of this excellent book on beef production.

Successful Poultry Management—*by M. A. Jull* $5.00
The second edition of this practical book on poultry.

Farm Management

Soil Development—*by E. H. Faulkner* $3.00
The author of *Plowman's Folly* starts another controversy.

Bobby Bluegill—*by R. W. Eschmeyer* $1.50
The story of a fish and his home, the pond, written for children.

Out of the Earth—*by Louis Bromfield* $4.00
Bromfield writes of farming for the farmer.

Modern Farm Management—*by Andrew Boss & G. A. Pond* $6.00
The principles and application of management to the farm.

Farm Work Simplification—*by L. M. Vaughn & L. S. Hardin* $2.80
The application of efficiency studies to farm work.

Success on the Small Farm—*by Haydn S. Pearson* $4.00
Subject—how to net $3,000 a year on 10 to 12 acres.

The Farmer's Handbook—*by John M. White* $4.95
Easy reference book on crops, livestock, and farm problems.

Front Porch Farmer—*by Channing Cope* $2.75
Year 'round grazing in the south; the easy way to farm.

Law on the Farm—*by H. W. Hannah* $5.50
An excellent reference on the law as it applies to farmers.

Soil and Crops

Soil Conditions and Plant Growth—*by E. J. and E. W. Russell* $8.75
An English classic on the chemistry, structure, and life of the soil.

The Pasture Book—*by W. R. Thompson* $3.50
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An understandable book on the complex subject of fertility.

Using and Managing Soils—*by A. F. Gustafson* $3.20
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Hunger Signs In Crops—*A Symposium* $4.50
How to diagnose fertility needs from the plants themselves.

Production of Field Crops—*by Hutcheson, Wolf & Kipps* $5.00
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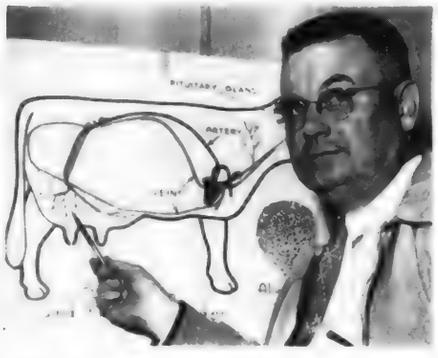
bring in blood lines that will help their herd, shipping the semen by air if the bull is located in some distant part of the country. They use a loafing barn, bringing the cows into the milking room for a fast milking with a milking machine. Mastitis has not been a problem and the father and son team gives credit to the loafing barn and natural conditions in which the cattle are handled for keeping it down.

In 1952 the Brooks were second prize winners in the Ohio Dairy Herd Improvement Production Efficiency Award.

Grades Can Be Built Up Too

Dick George farms near Lancaster, Ohio, on land that looks as if it might be in central Kentucky because of its rolling fields. His herd is made up of mostly grade cows. He is using an artificial insemination program and is a member of the Central Ohio Breeding Association. In 1946 he started with 17 grades and one purebred. He has bought five registered cattle of several breeds since that time and his herd now includes 45 animals that he has raised. By grading up and breeding his animals to the good sires that the artificial insemination ring maintains he built his milk from 7,000 pounds and 288 pounds of butterfat in 1946 to 9,000 pounds and 376 pounds of butterfat in 1949. He expects his average to be over 400 pounds of butterfat this year and close to 10,000 pounds of milk.

Probably no one sees more cows milked in a month than a milk tester. Fred Conrad, a milk tester who lives near Lancaster, Ohio, has done a good job of putting the advantages of concentrating on building up the production of a herd in a few words. He says, "It costs very little more to *feed* a high-producing cow than it does a poor one—but it costs a lot more to *keep* a poor producing one."



THE AUTHOR: R. R. Starbuck, who wrote "Building a High Production Dairy Herd," has a farmer's approach to dairying. He grew up on a farm in Clinton County, Ohio, and graduated from Washington College in 1917. He farmed from 1918 to 1930, then earned his Master's degree in 1932. He was a County Agent in two Ohio counties and a Professor of Agriculture at Rio Grande College in Ohio. Since 1945 he has been Extension Dairy Husbandman at Ohio State. He is also the Secretary of the Ohio Dairyman's Association. His short courses on dairying held all over Ohio give him a chance to hear all the hard-luck stories as well as the tales of cows that fill the milk pail twice at every milking. This Spring he again took on the job of building up a farm as well as a dairy herd when he purchased a farm in Madison County which he operates with his son-in-law and daughter.

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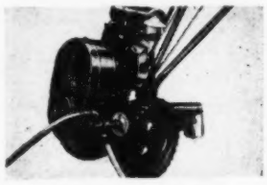

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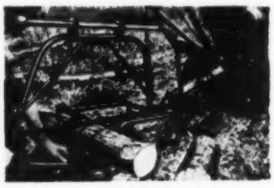

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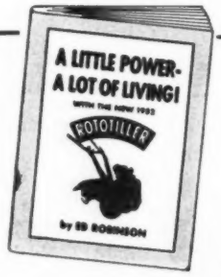

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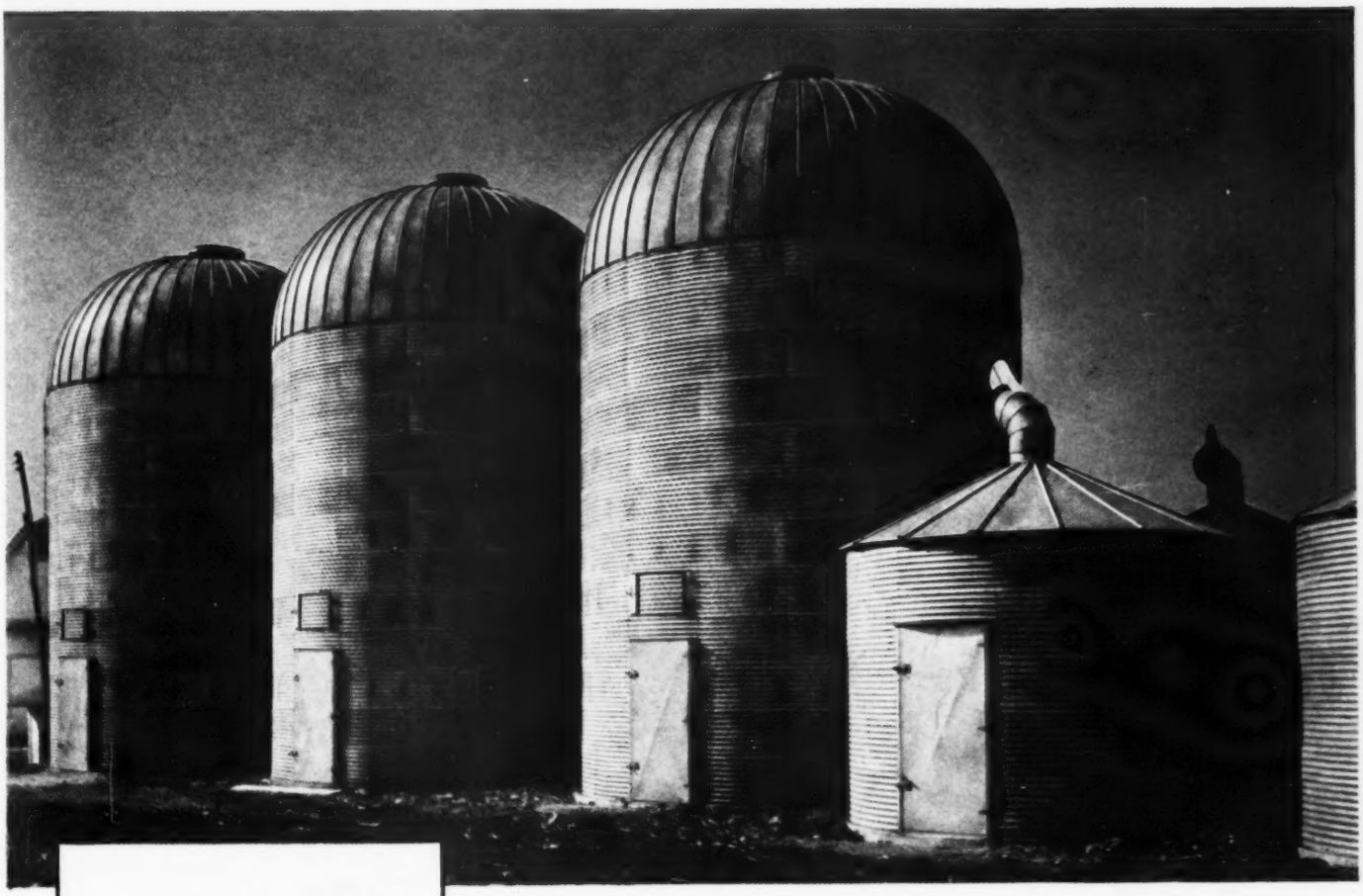

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"My corn wouldn't dry in my old-fashioned cribs and I lost about 25% of my crop from spoilage and rats," says Farmer N. G. Archer, Lockbourne, Ohio. "I couldn't spend any more time fooling around waiting for my corn to dry in the field—so I bought these Martin buildings.

"We are on a four-year rotation of corn, wheat and grass and these Martin cribs let us start picking our corn early so as not to fail on wheat and grass. We are in the beef cattle business and to fail on grass would put us out of business.

"Labor is expensive and hard to get, too, and my Martin system of mechanical filling and emptying saves me about 25% of my labor costs!"

ACT NOW

MARTIN STEEL PRODUCTS CORPORATION
803 Longview Avenue, Mansfield, Ohio

Please send me FREE literature on the Martin 8210

- ☐ HIGH ROUND CRIB
- ☐ SILO
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- ☐ SELF-FEEDING HAYMAKER
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- ☐ PLANS FOR N. G. ARCHER BUILDINGS SHOWN ABOVE

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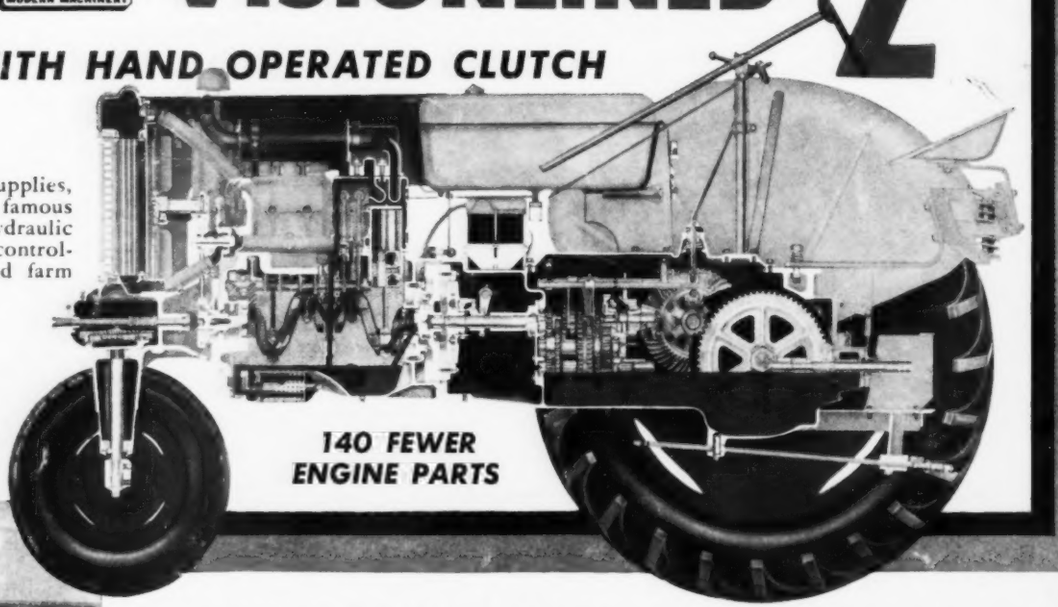
WHEN THEY KNOW THE INSIDE FACTS

PROFIT-WISE FARMERS CHOOSE THE MM VISIONLINED Z

WITH HAND OPERATED CLUTCH

UNI-MATIC POWER . . . MM supplies, as optional equipment on its famous Visionlined tractors, a new hydraulic unit for raising, lowering, and controlling mounted and pull-behind farm implements while on the go.



THE PREFERRED 2-3 PLOW TRACTOR...with plenty of reserve power!

It's better to have *plenty of power*, than not quite enough when you need it. *And the* MM *Z has a reserve of stepped-up power for drawbar, belt, and power take-off work!* Greater piston displacement of 206 cubic inches helps boost the power of the Z to deliver approximately 36 horsepower at the belt and about 31 horsepower at the drawbar. *You have plenty of power when you need it . . . MM economical power of proved dependability!*

The heavy-duty transmission of the Z runs in oil bath . . . has 5 forward speeds from 2.4 m.p.h. to 13.1 m.p.h. and a reverse of 2.2 m.p.h. Large 11-38 tires give greater traction . . . *gear it to the ground* for the roughest, toughest farm task.

TAKE A LOOK *INSIDE* . . .

. . . at the roller bearing mounted steering gear that gives new car handling ease . . . at the controlled cooling system which assures *uniform* temperature for *uniform* flow of MM economical power . . . at the drop-forged 3 bearing crankshaft . . . at the heavy-duty over-center twin disc clutch . . . note the precision cast iron pistons with 4 rings . . . study the full pressure lubrication system . . . marvel at the simplicity of the *exclusive* MM valve mechanism, one of the many *quality* engineered features which enabled MM engineers to produce a *powerful, dependable, economical engine* with 140 fewer moving parts!

Your 'Z owner-neighbors' will mention other *points of preference*:—the liberal use of oil seals that keep out dirt . . . the safe, smooth, comfortable operation assured by adjustable seat and steering wheel, non-slip platform, and conveniently located controls. They'll mention the high turbulence combustion chambers which cut fuel consumption . . . the easy accessibility for the minimum servicing required. Cylinder blocks cast in pairs with side openings is another outstanding feature which is a *point of preference* for the MM Visionlined Z.

THERE'S A Z TRACTOR DESIGNED FOR *YOUR* TYPE OF FARMING

The Visionlined ZAU has 2 front wheels together which by reversing have a tread of 12⅞ inches. Rear wheel tread is adjustable from 54 to 88 inches. For narrow row crop the Visionlined ZAN with a single 7.50 x 10 front wheel and 54 to 88 inch rear wheel tread is ideal. The standard tread Visionlined ZAS has a 47 inch front wheel tread with 54 inch or 59 inch rear wheel tread. The ZAE has a rear tread of 54 to 88 inches and a front axle permitting adjustment of front wheels from 56 to 84 inches at 4 inch intervals.

From MM owners and from your friendly MM dealer you'll want to get complete facts . . . learn about all the *points of preference* on the Visionlined Z . . . the satisfaction of owning the tractor that will help you produce more at lower cost! The Visionlined Z is *geared to the ground* . . . preferred for profitable production. It's the "buy" that gets you more for your money.

Quality Control **IN MM FACTORIES ASSURES DEPENDABLE PERFORMANCE IN THE FIELD**

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